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Operating and Maintenance Manual

General

General Instructions For Installation And Maintenance



W A R N I N G

It is important that the oil level in the gearbox is checked prior to starting the equipment. Should the gearbox oil level be found to low, you must top up with the correct grade of oil.

If the gearbox is not filled with oil at all you must fill to the correct level with suitable lubrication. Please see IoM for details.

Starting the equipment with low or no oil will cause early and expensive failures

If in any doubt please contact Mixertech Limited on

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MIXERTECH 1000/2000 SERIES FLUID MIXERS WITH FLENDER MOTOX & SEW GEARED MOTORS

CONTRACT NO:

SERIAL NO:

INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE

**PLEASE READ CAREFULLY BEFORE INSTALLING OR OPERATING
YOUR MIXERTECH MIXER**

INSTALLATION

General

Units should be bolted into place as rigidly as possible to minimise vibration and movement.

Where fitted 'G' clamp mounts should be tightened using a 10mm Allen Key.

Sleeve couplings are secured to geared motor shaft and mixer output shaft by 6 or 8mm offset grub screws. When assembling, care should be taken to ensure correct seating of grub screws into 'dimples' on respective shafts.

Split muff type couplings should be assembled with even tightening of bolts after checking that drive keys are clean and neatly engaged.

Propellers are secured in a similar manner with two 6mm grub screws.



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MAINTENANCE

General

Maintenance of **Mixertech** mixers is mainly limited to the geared driving motor, however, the periodic checking of mounting bolts and fixing grub screws is advised.

Geared Motor

To ensure adequate cooling, deposits of dirt and dust on the surfaces of the units must be removed at frequent intervals. Particular attention should be paid to the motor by removing all deposits from between the motor cooling fins and also from the air intake on the fan guard.

To ensure correct performance, highest efficiency and long life, it is essential that the lubricating oil be maintained at the correct level. The recommended grade of oil must be used at all times, since the use of unsuitable oil may result in excessive temperature rise, loss of efficiency and consequent damage to gears and bearings.

The lubricating oil level should be checked at regular intervals. We recommend that the first oil change should be carried out after approximately 500 hours initial operation and thereafter. Under normal operating conditions the oil should be changed every 10,000 operating hours. If however, a synthetic lubricant is used, then this period of time can be extended to 20,000 hours or alternatively four years maximum. In applications where arduous operating conditions exist, the lubricant should be changed at more frequent intervals. Grease packed bearings should be cleaned and re-greased every 10,000 hours, care being taken that only approximately 40% of the free volume of the bearing is filled with grease in order to avoid overheating of the bearing.

Whenever the lubricating oil is changed it is preferable to dismantle and thoroughly clean the gear case, gear wheels and bearings. After dismantling, the component parts of the gear unit should be thoroughly cleaned with flushing oil or cleaning benzine and all gear case joints should be cleaned to ensure that all traces of the original sealing compound are removed. Any foreign matter and the cleaning fluid should be removed from the gear unit bearings and gear wheels. The bearings should be re-greased immediately after cleaning and drying. When re-assembling, all mating



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Surfaces of the gear case must be free from oil and grease and coated with an oil resistant sealing compound.

IMPORTANT

When the recommended lubricate is not available, it is permissible to use a lubricant having similar characteristics, but we do not recommend that the lubricants of difference manufacture be mixed. Under no circumstances should a synthetic lubricant be mixed with one having a mineral base.



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Gearboxes are filled prior to despatch with correct quantity and grade of lubricating oil (or grease where specified).

Important

Before putting the unit into service, change the closing plug in the highest position for the breather plug supplied.

Electrical Connections

Care should be taken to connect the motor correctly in accordance with the information contained on the motor data plate and the circuit diagram contained in the motor terminal box. The motor starter should incorporate an overload device to protect the windings against damage which, could otherwise result from overload or failure of one or more phases of the electrical supply.

This is particularly important in cases where the motor starter windings are not provided with built in temperature detectors connected to suitable overriding control gear. In the case of motors controlled by Star/Delta starters, the line voltage must correspond to the Delta voltage as indicated on the motor data plate. Motors rated up to 4 kW are suitable for direct on line starting if local regulations permit. Care should be taken at all times to ensure adequate ventilation of the motor.

IMPORTANT

1. **PROPELLER SHOULD ROTATE IN A CLOCKWISE (DOWN THRUST) DIRECTION (VIEWED FROM TOP DRIVE END).**
2. **UNIT SHOULD NOT BE RUN WHILE FILLING OR EMPTYING VESSEL UNLESS STABILIZER IS FITTED.**



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Trouble Shooting Tips

Your Mixertech mixer drive will perform satisfactorily if the following suggestions are carefully carried out.

It is estimated that approximately 98 percent of gear reduction failures can be attributed to improper lubrication, misapplication and misalignment.

Improper lubrication causes a high percentage of gear reduction unit failures. Too frequently speed reducers are started up without any lubricant at all. Conversely, units are sometimes filled to a higher oil level than specified in the belief that better lubrication is obtained. This higher oil level usually results in more of the input power going in to churning of the oil, creating excessive temperatures with detrimental results to the bearings and gearing. Insufficient lubrication causes the same results.

Gear failure due to overload is a broad and varied area of misapplication. The nature of load (input torque, output torque, duration of operating cycle , shocks, speed, acceleration, etc.) determines the gear unit sizing and other design criteria. Generally, a mixer drive must be larger than the torque output capability of the prime mover would indicate.

A gearbox service factor compensates for varying severity of application conditions by providing a higher nominal power rating which in effect increases the size of the gear unit. If there is any question in the user's mind that the actual service conditions may be more severe than originally anticipated, it is recommended that this information be communicated to the mixer supplier before start- up. Often there are remedies that can be suggested before a mixer unit is damaged by overload, but none are effective after severe damage occurred.



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Motors and other prime movers should be analysed while driving the mixer unit under fully loaded conditions to determine that the prime mover is not overloaded and thus putting out more than rated torque. If it is determined that overload does exist, the unit should be stopped and steps taken to either remove the overload or contact Mixertech to determine suitability of the gear drive under observed conditions.

Once the mixer has been delivered to site and installed, check the following items:-

This is known as '**RAMBO**'

1. **Rotation** - Is the mixer going around in the correct direction.
2. **Assembly** - Is the mixer assembled correctly, especially the impeller - check the GA drawing
3. **Mounting Arrangement** - Check the gearbox is level and the shaft is vertical.
4. **Bolting** - Are all bolts torqued to the correct readings.
5. **Oil** - Check oil level and grade in gearbox.

Once these simple five steps have been completed hot commissioning can commence.

If during hot commissioning problems occur, check the following trouble shooting charts for possible causes.



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Problem: The electrical motor constantly trips out or is running at a high temperature.

Note: Most motors are to Class F, temperature will rise which gives an operating temperature to 100 degrees C. Direct sunlight and high ambient temperatures could cause this to rise by as much as 15 degrees.

Inspection	Action
Check Tank	Check number and sizes of baffles, also proximity of impeller to tank bottom.
Sample Tank Contents	Check specific gravity of tank contents.
Gearbox	Is unit free to rotate? Remove motor Fan cover and rotate by hand. If answer is No - then see ' Gearbox won't rotate'
Check Rotation	See direction arrow on nameplate.
Check Oil	Remove and refill with correct grade of oil and grease.
Check Oil Level	Use dipstick or oil level plug. Top up if required.
Check Breather	Clean with solvent or paraffin.
Check Impeller	Remove any debris. Measure diameter tip to tip and check with GA drawing.



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Check Speed of Rotation

Count number of revolutions per Minute of output shaft and check nameplate for same.

Check Gearbox Mounting

Release holding down bolts and re-shim to level gearbox.

Check Input Coupling

Disconnect motor. Realign as required.

Check oil Seals

Oil seals must be grease packed . High temperatures will cause seals to crack.

Switch Gear

Check overload settings.

Motor in Direct Sunlight.

Shade motor - do not cover - allow for good ventilation.



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Problem: Gearbox won't rotate or is difficult to turn. Gearbox should be free to rotate by hand , they do not require a running-in period.

Inspection	Action
Check Gearbox Mounting	If gearbox is incorrectly bolted down then the casing can be twisted thus misaligning bearings and gears.
Bearings	Remove cover plates, check bearings for wear or obstructions. Replace as necessary . Check end float in workshop.
Gears	Remove inspection cover, if worn return to workshop for repair. Check backlash If excessive return to workshop for repair.
Check Gearbox Internals	Corrosion of bearings and gears is possible after long storage. Return to workshop for overhaul. Remove any mud or sand. Return to workshop for overhaul. Modify installation to prevent ingress of solids.
Check Stuffing Box.	Slacken glandplate. Back of packing.



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Problem: Gearbox leaks oil - oil at high temperature is almost impossible to seal. It can weep through gearbox casings, out of breathers and at shaft oil seals. The mess this can make is usually out of all proportion to the amount actually lost. Good house-keeping is required to remove any surface deposits.

Inspection	Action
---	---
Drive Output shaft	Has recommended oil level been exceeded. Check oil level in gearbox, when stationary.
Is breather clean and open	A dirty blocked breather will not allow the hot air in the gearbox to escape. This will pressurize box and force oil out. Clean breather in paraffin or solvent.
Check Housings and Caps	Tighten bolts. If it still persists apply joint sealer - <u>do not fit gaskets.</u> End caps and body joints are machined surfaces and additional packing will alter gearbox tolerances, end float etc.
Check Oil Seals	Replace if worn. Check shaft for damage. Polish if necessary.
Check Housing Joint	Check oil level, reduce if necessary.
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Problem: Gearbox is running hot. Although heat can be a sign of wear, it need not always be true. Gearbox temperatures normally rise by up to 80 degrees C and the final operating temperature can be over 100 degrees C. The gearbox will operate without problems at this temperature and higher provided the correct lubrication is supplied and changed at the prescribed intervals. However, if sudden or unexpected temperature increase occurs check the following:-

Inspection	Action
Is oil level low	Check oil level in gearbox.
Check Breather	Breather must be open and clean.
Check oil seal	Output shaft bearing and oil seal are grease lubricated . Re-lubricate and check oil seal for damage.
Oil Grade	Check grade. Flush box and refill with correct lubricant.
Oil quality and condition	Constant running at high temperatures causes rapid breakdown of lubricant. Check to see if oil has oxidized, dirty or contains sludge. Flush box and refill.
Check input coupling alignment	Disconnect coupling and realign.
Check bearing adjustment.	Bearings must not be pinched or Binding. Adjust to correct end float. All shafts must spin freely when disconnected from load.



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Problem: Mixer vibrates or is rocking - because a mixer is rotating equipment it will vibrate and rock. However, excessive movement is detrimental to the equipment and could cause premature failure.

Inspection	Action
Check Impellers	Tighten bolts if required. Check for correct installation.
Check holding down bolts.	Tighten bolts on mixer bridge and baseplate.
Check foundation steelwork	Stiffen or brace steelwork.
Check shaft.	Is it straight? Is it vertical? Drop plumbline from coupling.
Check output coupling	Is it fitted correctly? Remove burrs And sharp edges - tighten coupling bolts.
Critical speed	Refer to supply for design calculations. Reduce speed to 30% below critical speed.
Steady bearing (if fitted)	Check for wear and for slack bolts.
Liquid level	Is mixer designed to operate at varying liquid levels. Check stabilizers on blades. Limit variation.



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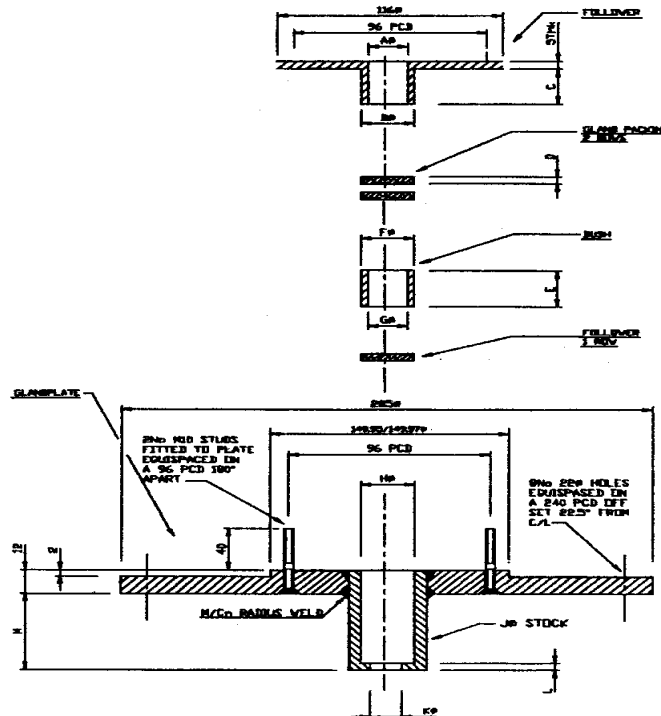
Problem: Mixer makes a noise - a mixer is a rotating piece of equipment and as such will generate noise. The noise level will normally be 85 decibels at 1 metre which will be consistent. Beware random noise or knocks and high pitch sounds.

Inspection	Action
Check motor fan cowling	Re-adjust as necessary.
Check Bearings	Replace or lubricate
Check gears	Adjust or replace
Check gear casing	Remove any debris found and refill With correct grade of lubricant. Remove rust and make necessary provision to prevent entrance of water.
Check tank contents	Remove any timber, hard hats etc.

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Gland Plate Assembly

This is best achieved by simply allowing the gland plate assembly to slide down the shaft and rest on top of the nozzle one down place each of the bolts through the plate and nozzle and tighten to the recommended bolt torque.



Incorrect assembly of the Gland Plate will cause early failure of the Mixer/Agitator. If in any doubt please do not hesitate to contact us.



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***TITLE: REMOVABLE FLANGE COUPLING
FITTING PROCEEDURE***

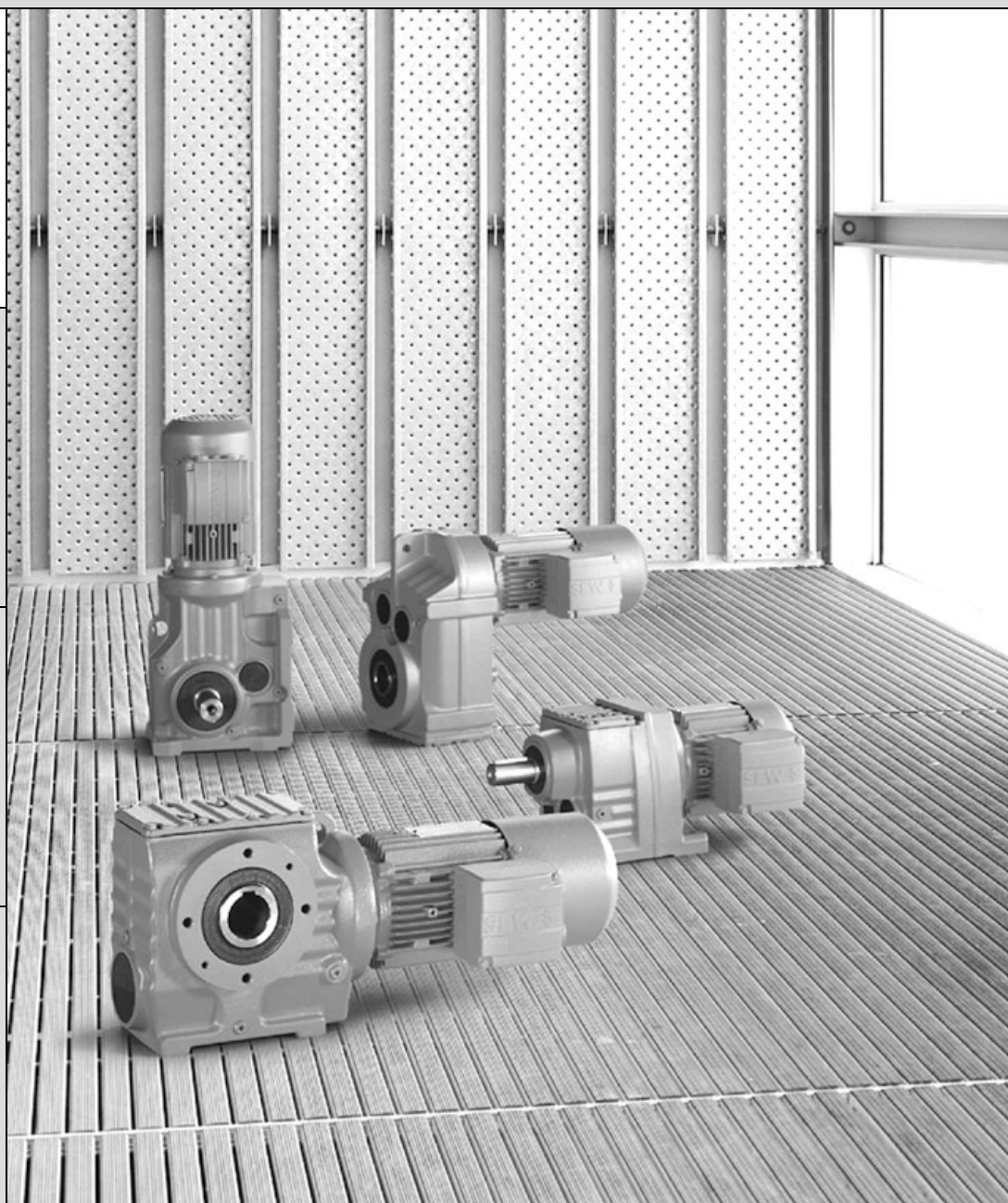
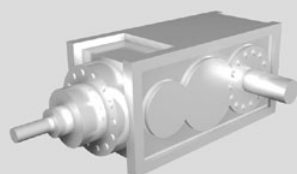
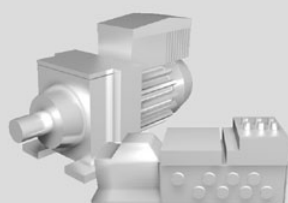
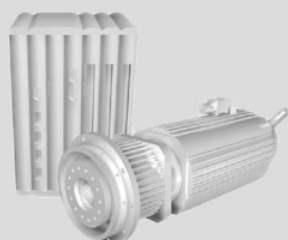
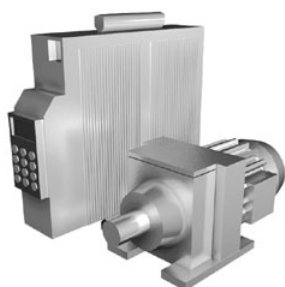
Modification

Please refer to Drawing No. 1000/01

- 1. Ensure shaft end, and inside of coupling are clean and free from burrs.*
- 2. Ensure shoulder on shaft is also clean and free from burrs.*
- 3. Fit key (5) into shaft.*
- 4. Smear shaft with copper slip or other anti-galling substance.*
- 5. Slide coupling (4) onto shaft (1).*
- 6. Ensure shaft sits down on shaft shoulder and the slide fit is a neat fit i.e. coupling does not rock on shaft.*
- 7. Fit locating/spigot plate (3) to coupling ensure shaft end does not protrude past spigot plate face.*
- 8. Fit 8.8 H.T bolts c/w spring washer and torque to recommend bolting torques given in service manual for the correct bolt size. Ensure bolt heads do not protrude outside spigot plate.*
- 9. Remove coupling in reverse order.*



SEW
EURODRIVE



Gear Units, R..7, F..7, K..7, S..7 Series, SPIROPLAN® W

A6.B01

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Operating Instructions





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1 Important Notes

Safety and warning instructions

Always follow the safety and warning instructions in this publication!



Electrical hazard

Possible consequences: Severe or fatal injuries.



Hazard

Possible consequences: Severe or fatal injuries.



Hazardous situation

Possible consequences: Slight or minor injuries.



Harmful situation

Possible consequences: Damage to the drive and the environment.



Tips and useful information.



You must adhere to the operating instructions to ensure:

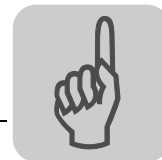
- Trouble-free operation
- Fulfillment of any rights to claim under guarantee

Consequently, read the operating instructions before you start working with the gear unit!

The operating instructions contain important information about servicing. Therefore, keep the operating instructions close to the gear unit.



- Adjust the lubricant fill volume and position of the breather valve accordingly in the event of a change of mounting position (see Sec. "Lubricants" and "Mounting Positions").
- Follow the instructions in Sec. "Mechanical installation" / "Installing the gear unit"!

**Waste disposal**

Please follow the latest instructions: Dispose of the following materials in accordance with the regulations in force:

- Steel scrap:
 - Housing parts
 - Gears
 - Shafts
 - Anti-friction bearing
 - Gray-cast iron (if there is no special collection)
- Parts of the worm gears are made of non-ferrous metals. Dispose of the worm gears as appropriate.
- Collect waste oil and dispose of it correctly.



2 Safety Notes

Preface

The following safety notes are primarily concerned with the use of gear units. If using **gearmotors**, please also refer to the safety notes for motors in the relevant operating instructions.

Please also consider the supplementary safety notes in the individual sections of these operating instructions.

General information

During and after operation, gearmotors, gear units and motors have:

- Live parts
- Moving parts
- Hot surfaces (may be the case)

Only qualified personnel may carry out the following work:

- Transportation
- Putting into storage
- Installation / assembly
- Connection
- Startup
- Maintenance
- Servicing

The following information and documents must be observed during these processes:

- Relevant operating instructions and wiring diagrams
- Warning and safety signs on the gear unit / gearmotor
- System-specific regulations and requirements
- National / regional regulations governing safety and the prevention of accidents

Serious injuries and property damage may result from:

- Improper use
- Incorrect installation or operation
- Unauthorized removal of necessary protection covers or the housing

Designated use

Garmotors / gear units from SEW are intended for industrial systems. They correspond to the applicable standards and regulations.

Technical data and information about the permitted conditions can be found on the nameplate and in the documentation.

It is essential that you follow all the instructions!



Transportation

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be that you are not permitted to startup the drive due to the damage.

Tighten installed eyebolts. The eyebolts are only designed for the weight of the gearmotor / gear unit. Do not attach any additional loads.

The installed lifting eyebolts comply with DIN 580. The loads and regulations specified in this standard must always be observed. If two eyebolts are available, use both of them for transport. In this case, the tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

Extended storage of gear units

Gear units of the "extended storage" type have:

- An oil fill suitable for the mounting position so the unit is ready to run (mineral oil CLP and synthetic oil CLP HC). You should still check the oil level before startup (see Sec. "Inspection / Maintenance" / "Inspection and maintenance of the gear unit").
- A higher oil level in some cases (synthetic oil CLP PG / food grade oil). Correct the oil level before startup (see Sec. "Inspection / Maintenance" / "Inspection and maintenance of the gear unit").

Comply with the storage conditions specified in the following table for extended storage:

Climate zone	Packaging ¹⁾	Storage location	Storage time
Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	With roof, protected against rain and snow, no shock loads.	Up to three years with regular checks on the packaging and moisture indicator (relative atmospheric humidity < 50 %).
	Open	With roof, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50 % relative atmospheric humidity). No sudden temperature fluctuations and controlled ventilation with filter (free from dirt and dust). No aggressive vapors and no shock loads.	Two years or more given regular inspections. Check for cleanliness and mechanical damage as part of the inspection. Check corrosion protection.
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap. Protected against insect damage and mildew by chemical treatment.	With roof, protected against rain, no shock loads.	Up to three years with regular checks on the packaging and moisture indicator (relative atmospheric humidity < 50 %).
	Open	With roof, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50 % relative atmospheric humidity). No sudden temperature fluctuations and controlled ventilation with filter (free from dirt and dust). No aggressive vapors and no shock loads. Protection against insect damage.	Two years or more given regular inspections. Check for cleanliness and mechanical damage as part of the inspection. Check corrosion protection.

1) Packaging must be performed by an experienced company using the packaging materials that have been expressly specified for the particular application.

***Installation /
assembly***

Observe the instructions in the sections "Installation" and "Assembly/Removal"!

***Startup /
operation***

Check that the direction of rotation is correct in **decoupled** status. Listen out for unusual grinding noises as the shaft rotates.

Secure the shaft keys for test mode without drive components. Do not render monitoring and protection equipment inoperative even for test mode.

Switch off the gearmotor if in doubt whenever changes occur in relation to normal operation (e.g. increased temperature, noise, vibration). Determine the cause; contact SEW-EURODRIVE if necessary.

***Inspection /
maintenance***

Follow the instructions in the section "Inspection and Maintenance"!

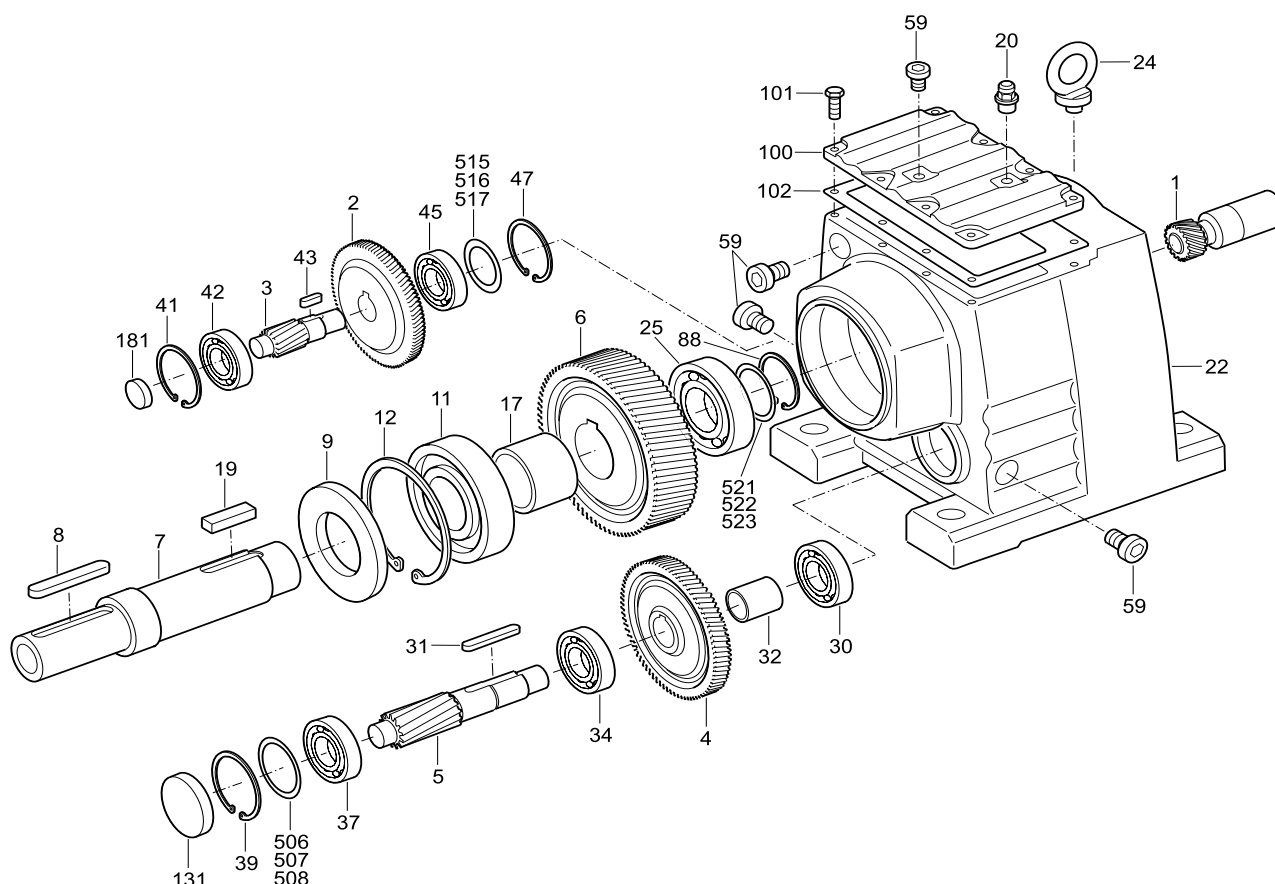


3 Gear Unit Structure



The following figures are block diagrams. Their purpose is only to make it easier to assign components to the spare parts lists. Discrepancies may occur depending on the gear unit size and version!

3.1 Basic structure of helical gear units



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Figure 1: Basic structure of helical gear units

Key

1 Pinion	19 Key	42 Anti-friction bearing	507 Shim ring
2 Gear	20 Breather valve	43 Key	508 Shim ring
3 Pinion shaft	22 Gearcase	45 Anti-friction bearing	515 Shim ring
4 Gear	24 Lifting eyebolt	47 Circlip	516 Shim ring
5 Pinion shaft	25 Anti-friction bearing	59 Screw plug	517 Shim ring
6 Gear	30 Anti-friction bearing	88 Circlip	521 Shim ring
7 Output shaft	31 Key	100 Gearcase cover	522 Shim ring
8 Key	32 Spacer	101 Hex head bolt	523 Shim ring
9 Oil seal	34 Anti-friction bearing	102 Gasket	
11 Anti-friction bearing	37 Anti-friction bearing	131 Closing cap	
12 Circlip	39 Circlip	181 Closing cap	
17 Spacer	41 Circlip	506 Shim ring	



Gear Unit Structure

Basic structure of parallel shaft helical gear units

3.2 Basic structure of parallel shaft helical gear units

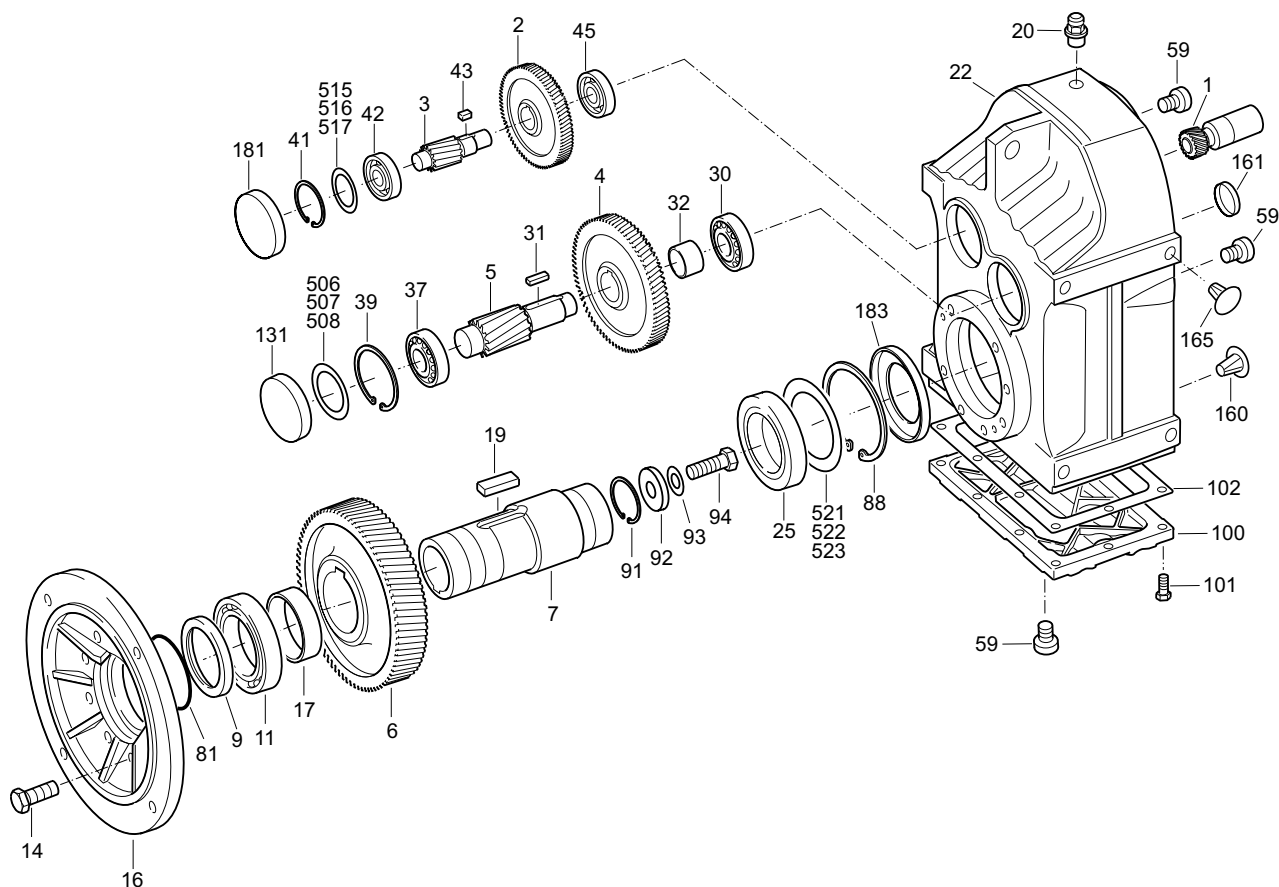


Figure 2: Basic structure of parallel shaft helical gear units

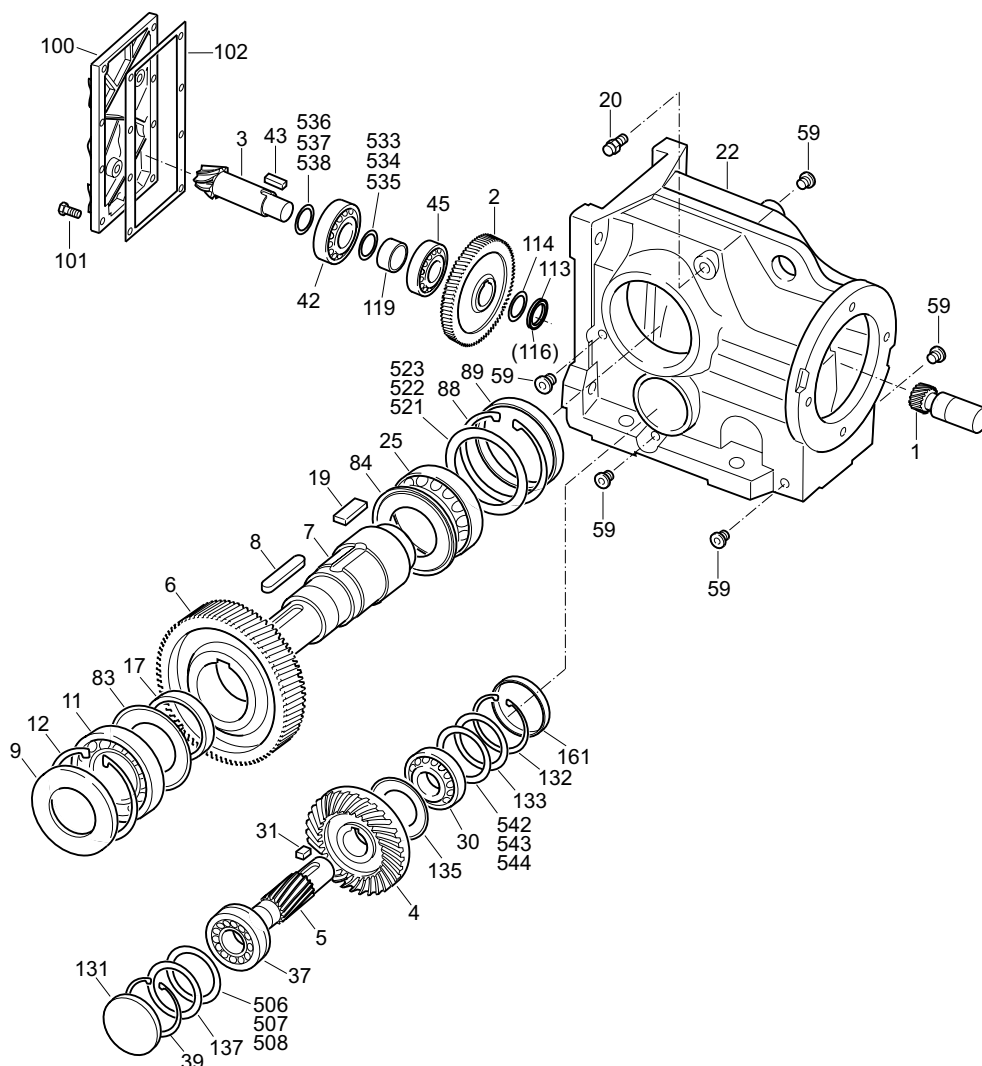
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Key

1 Pinion	22 Gearcase	91 Circlip	506 Shim ring
2 Gear	25 Anti-friction bearing	92 Washer	507 Shim ring
3 Pinion shaft	30 Anti-friction bearing	93 Lock washer	508 Shim ring
4 Gear	31 Key	94 Hex head bolt	515 Shim ring
5 Pinion shaft	32 Spacer	100 Gearcase cover	516 Shim ring
6 Gear	37 Anti-friction bearing	101 Hex head bolt	517 Shim ring
7 Hollow shaft	39 Circlip	102 Gasket	521 Shim ring
9 Oil seal	41 Circlip	131 Closing cap	522 Shim ring
11 Anti-friction bearing	42 Anti-friction bearing	160 Closing plug	523 Shim ring
14 Hex head bolt	43 Key	161 Closing cap	
16 Output flange	45 Anti-friction bearing	165 Closing plug	
17 Spacer	59 Screw plug	181 Closing cap	
19 Key	81 O-ring	183 Oil seal	
20 Breather valve	88 Circlip		



3.3 Basic structure of helical-bevel gear units



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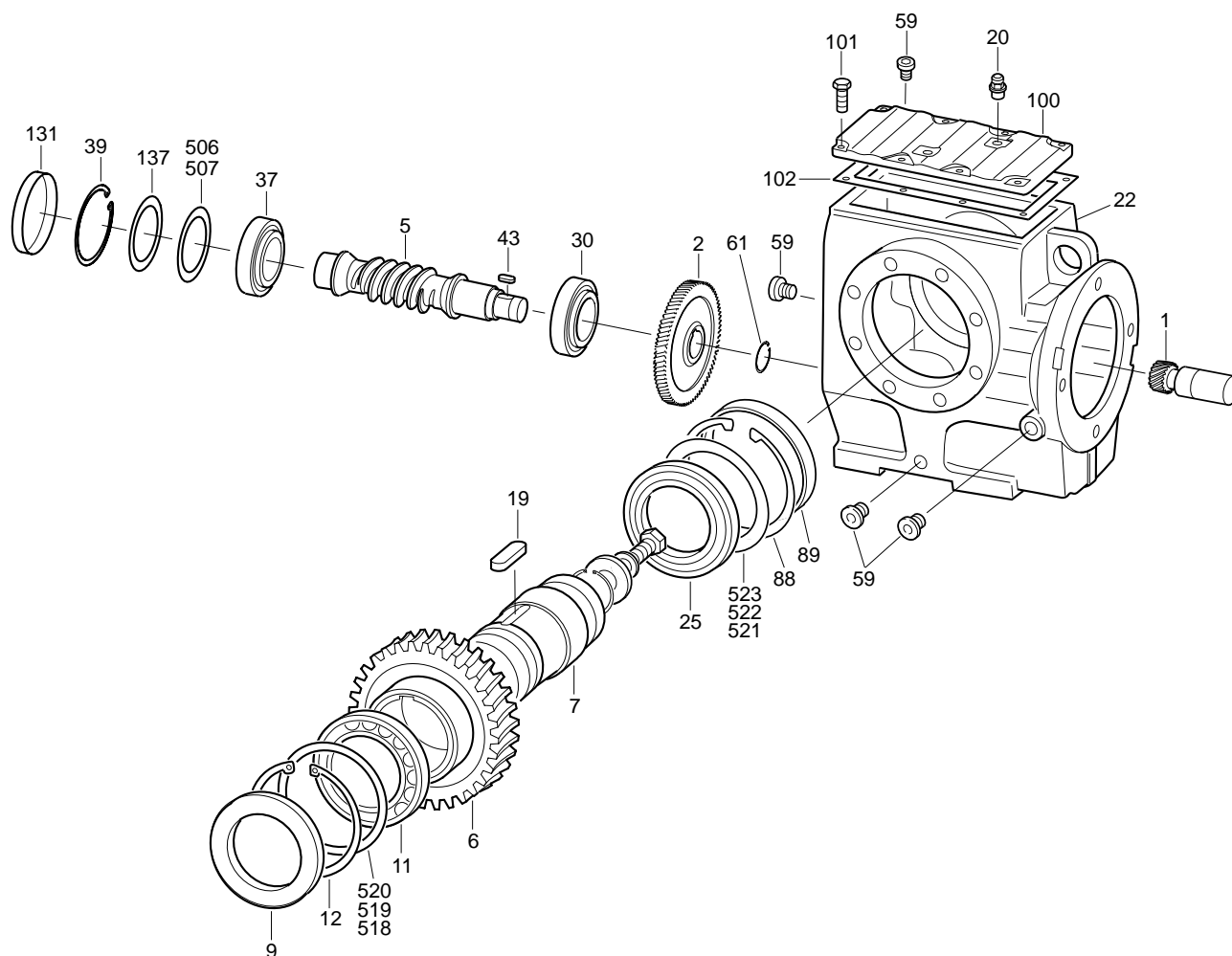
Figure 3: Basic structure of helical-bevel gear units

Key

1 Pinion	25 Anti-friction bearing	102 Adhesive and sealing compound	522 Shim ring
2 Gear	30 Anti-friction bearing	113 Slotted round nut	523 Shim ring
3 Pinion shaft	31 Key	114 Multi-tang washer	533 Shim ring
4 Gear	37 Anti-friction bearing	116 Thread lock	534 Shim ring
5 Pinion shaft	39 Circlip	119 Spacer	535 Shim ring
6 Gear	42 Anti-friction bearing	131 Closing cap	536 Shim ring
7 Output shaft	43 Key	132 Circlip	537 Shim ring
8 Key	45 Anti-friction bearing	133 Spacer	538 Shim ring
9 Oil seal	59 Screw plug	135 Nilos ring	542 Shim ring
11 Anti-friction bearing	83 Nilos ring	161 Closing cap	543 Shim ring
12 Circlip	84 Nilos ring	506 Shim ring	544 Shim ring
17 Spacer	88 Circlip	507 Shim ring	
19 Key	89 Closing cap	508 Shim ring	
20 Breather valve	100 Gearcase cover	521 Shim ring	
22 Gearcase	101 Hex head bolt	521 Shim ring	



3.4 Basic structure of helical-worm gear units



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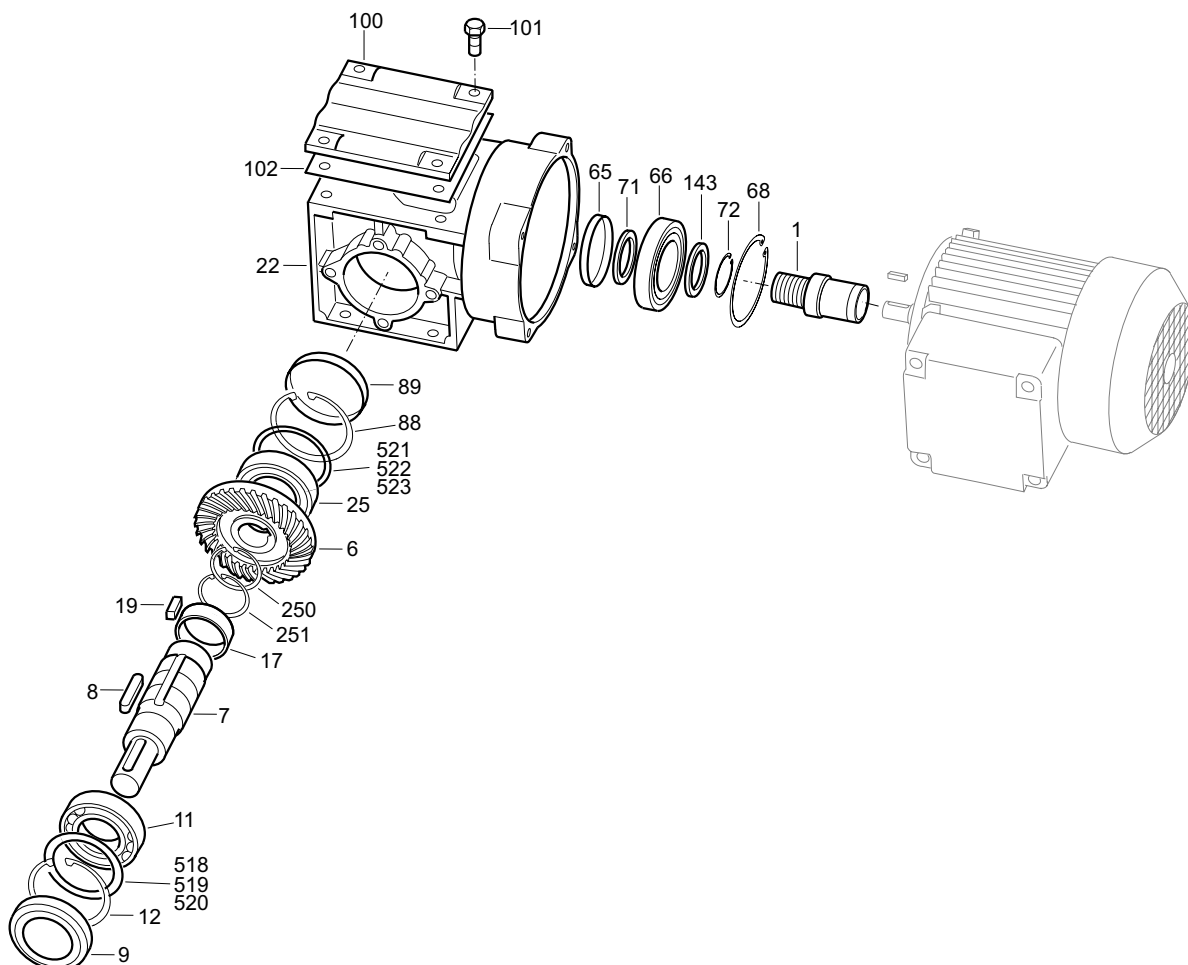
Figure 4: Basic structure of helical-worm gear units

Key

1	Pinion	20	Breather valve	88	Circlip	518	Shim ring
2	Gear	22	Gearcase	89	Closing cap	519	Shim ring
5	Worm	25	Anti-friction bearing	100	Gearcase cover	520	Shim ring
6	Worm gear wheel	30	Anti-friction bearing	101	Hex head bolt	521	Shim ring
7	Output shaft	37	Anti-friction bearing	102	Rubber seal	522	Shim ring
9	Oil seal	39	Circlip	131	Closing cap	523	Shim ring
11	Anti-friction bearing	43	Key	137	Spacer		
12	Circlip	59	Screw plug	506	Shim ring		
19	Key	61	Circlip	507	Shim ring		



3.5 Basic structure of SPIROPLAN® gear units



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Figure 5: Basic structure of SPIROPLAN® gear units

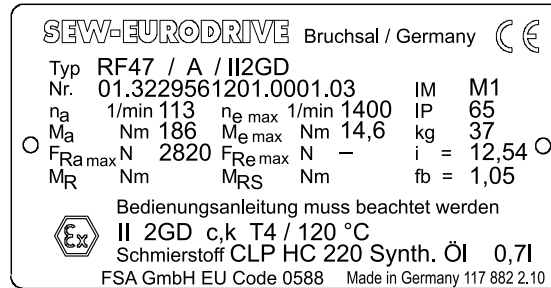
Key

1	Pinion	19	Key	88	Circlip	251	Circlip
6	Gear	22	Gearcase	89	Closing cap	518	Shim ring
7	Output shaft	25	Anti-friction bearing	100	Gearcase cover	519	Shim ring
8	Key	65	Oil seal	101	Hex head bolt	520	Shim ring
9	Oil seal	66	Anti-friction bearing	102	Gasket	521	Shim ring
11	Anti-friction bearing	71	Spacer	132	Circlip	522	Shim ring
12	Circlip	72	Circlip	183	Oil seal	523	Shim ring
17	Spacer	143	Spacer	250	Circlip		



3.6 Nameplate, unit designation

Sample nameplate



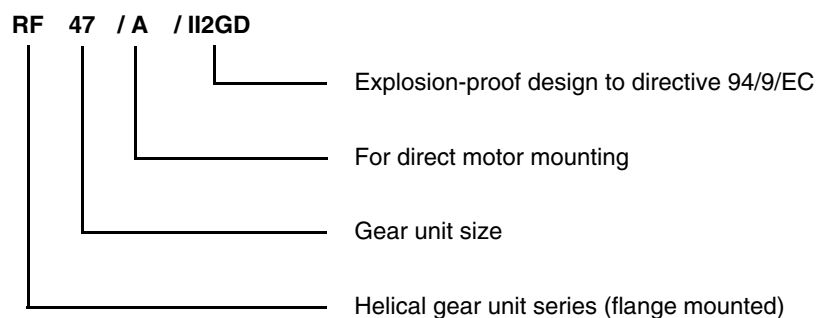
06687ADE

Figure 6: Sample nameplate

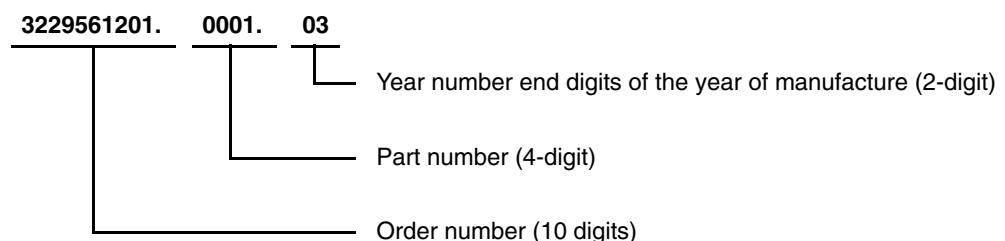
f_b		= Service factor
$F_{Ra \max}$	[N]	= Maximum overhung load on the output side
$F_{Re \max}$	[N]	= Maximum overhung load on the input side (with input shaft assembly AD)
i		= Gear unit reduction ratio
IM		= Mounting position
IP..		= Enclosure
$n_{e \max}$	[1/min]	= Maximum input speed
n_a	[1/min]	= Output speed
$M_{e \max}$	[Nm]	= Maximum input torque
M_a	[Nm]	= Output torque
M_R	[Nm]	= Overload torque when using an AR adapter
M_{RS}	[Nm]	= Locking torque of the backstop

Unit designation

Example: Helical gear unit, category II2GD



Example: Serial number





4 Mechanical Installation

4.1 Required tools / aids

- Set of spanners
- Torque wrench for:
 - Shrink discs
 - AQH motor adapter
 - Input shaft assembly with centering shoulder
- Mounting device
- Shims and distance rings if necessary
- Fixing devices for input and output elements
- Lubricant (e.g. NOCO® Fluid)
- Bolt adhesive (for input shaft assembly with centering shoulder), e.g. Loctite® 243
- Standard parts are not part of the delivery

Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 <ul style="list-style-type: none"> • ISO k6 for solid shafts with $\varnothing \leq 50$ mm • ISO m6 for solid shafts with $\varnothing > 50$ mm • ISO H7 for hollow shafts • Center bore in accordance with DIN 332, shape DR 	Centering shoulder tolerance in accordance with DIN 42948 <ul style="list-style-type: none"> • ISO j6 with $b_1 \leq 230$ mm • ISO h6 with $b_1 > 230$ mm

4.2 Prerequisites for assembly

Check that the following conditions have been met:

- The data on the nameplate of the gearmotor matches the voltage supply system.
- The drive has not been damaged during transportation or storage.
- Ensure that the following requirements have been met:
 - **For standard gear units:**
 Ambient temperature according to the lubricant table in Sec. "Lubricants" (see standard).
 The drive must not be assembled in the following ambient conditions:
 - Potentially explosive atmosphere
 - Oil
 - Acids
 - Gas
 - Vapors
 - Radiation
 - **For special versions:**
 The drive configured in accordance with the ambient conditions.
 - **For helical-worm / SPIROPLAN® W gear units:**
 No large external mass moments of inertia which could exert a retrodriving load on the gear unit.
 [At η' (retrodriving) = $2 - 1/\eta < 0.5$ self-locking]



Mechanical Installation

Installing the gear unit

- You must clean the output shafts and flange surfaces thoroughly to ensure they are free of anti-corrosion agents, contamination or similar. Use a commercially available solvent. Do not let the solvent come into contact with the sealing lips of the oil seals – danger of damage to the material!
- When the drive is installed in abrasive ambient conditions, protect the output end oil seals against wear.

4.3 Installing the gear unit

The gear unit or gearmotor is only allowed to be installed in the specified mounting position. SPIROPLAN® gear units are not dependent on the mounting position.

The support structure must have the following characteristics:

- Level
- Vibration damping
- Torsionally rigid

Maximum permitted flatness error for foot and flange mounting (approximate values with reference to DIN ISO 1101):

- Gear unit size ≤ 67 : max. 0.4 mm
- Gear unit size 77 ... 107: max. 0.5 mm
- Gear unit size 137 ... 147: max. 0.7 mm
- Gear unit size 157 ... 187: max. 0.8 mm

Do not tighten the housing legs and mounting flanges against one another and ensure that you comply with the permitted overhung and axial loads!

Secure the gearmotors with bolts of quality 8.8.

Secure the following gearmotors with bolts of quality 10.9:

- RF37, R37F with flange \varnothing 120 mm
- RF47, R47F with flange \varnothing 140 mm
- RF57, R57F with flange \varnothing 160 mm



The oil checking and drain screws and the breather valves must be freely accessible!

At the same time, also check that the oil fill is as specified for the mounting position (see Sec. "Lubricants" / "Lubricant fill quantities" or refer to the information on the nameplate). The gear units are filled with the required oil volume at the factory. There may be slight deviations at the oil level plug as a result of the mounting position, which are permitted within the manufacturing tolerances.



Adjust the lubricant fill volumes and the position of the breather valve accordingly in the event of a change of mounting position.

Please contact our SEW customer service if you change the mounting position of K gear units to M5 or M6 or between M5 and M6.

Please contact our SEW customer service if you change the mounting position of size S47 S97 S gear units to mounting position M2.

Use plastic inserts (2 ... 3 mm thick) if there is a risk of electrochemical corrosion between the gear unit and the driven machine. The material used must have an electrical bleeder resistor $< 10^9 \Omega$. Electrochemical corrosion can occur between various metals, for example, cast iron and high-grade steel. Also install the bolts with plastic washers! Ground the housing additionally – use the grounding bolts on the motor.

*Installation in
damp locations or
in the open*

Drives are supplied in corrosion-resistant versions for use in damp areas or in the open air. Repair any damage to the paint work (e.g. on the breather valve).

When mounting the motors onto AM, AQ, AR, AT adapters, seal the flange areas with a suitable sealing compound, e.g. Loctite® 574.



Mechanical Installation

Installing the gear unit

Gear unit venting

No breather plug is required for the following gear units:

- R07 in mounting positions M1, M2, M3, M5 and M6
- R17, R27 and F27 in mounting positions M1, M3, M5 and M6
- SPIROPLAN® W gear units

SEW-EURODRIVE supplies all other gear units with the breather valve installed and activated according to the particular mounting position.

Exceptions:

1. SEW supplies the following gear units with a screw plug on the vent hole provided:

- Gear units for extended storage
- Pivoted mounting positions, if possible
- Gear units for mounting on a slant

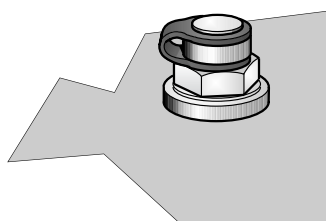
The breather valve is located in the motor terminal box. Before startup, you must replace the highest screw plug with the breather valve supplied.

2. SEW supplies a breather valve in a plastic bag for **gear head units** requiring venting on the input end.
3. **Enclosed gear units** are supplied without a breather valve.

Activating the breather valve

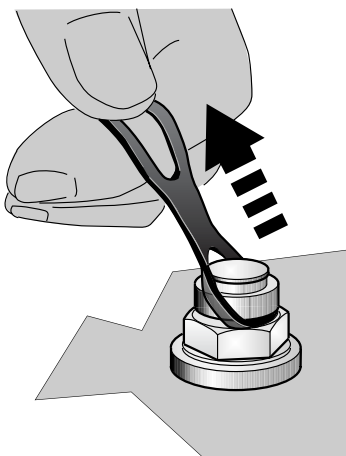
As a rule, the breather valve is already activated at the factory. If the breather valve has not been activated, you must remove the transport fixture from the breather valve before starting up the gear unit!

1. Breather valve with transport fixture



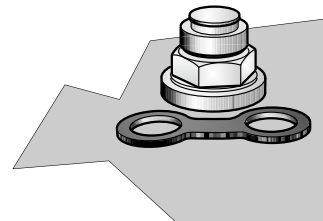
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2. Remove the transport fixture



02054BXX

3. Breather valve activated



02055BXX

Painting the gear unit

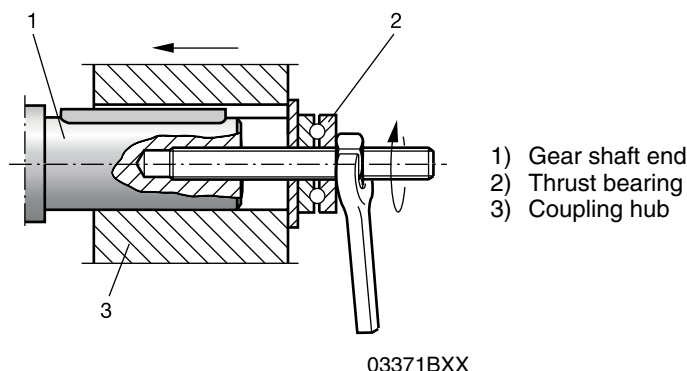
If you paint or respray the drive, ensure that you cover the breather valve and oil seals carefully. Remove the strips of tape after completing the painting work.



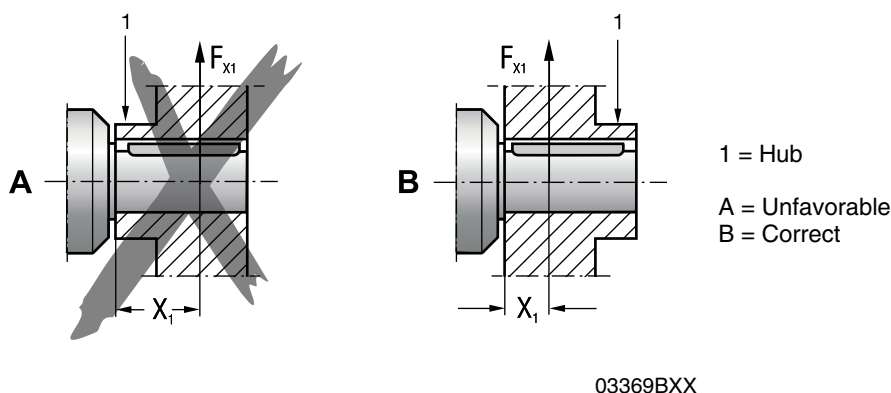
4.4 Gear unit with solid shaft

Installing input and output elements

The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. It may be possible to dispense with the thrust bearing on the mounting device.



Avoid impermissibly high overhung loads: Install the gear or chain sprocket according to figure B.



- Only use a mounting device for installing input and output elements. Use the center bore and the thread on the shaft end for positioning.
- **Never drive belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer. This will damage the bearings, housing and the shaft!**
- **In the case of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.**
- Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces (see the "Gearmotor" or "Explosion-Proof Drives" catalogs for permitted values).



Note:

Assembly is easier if you first apply lubricant to the output element or heat it up briefly (to 80 ... 100 °C).



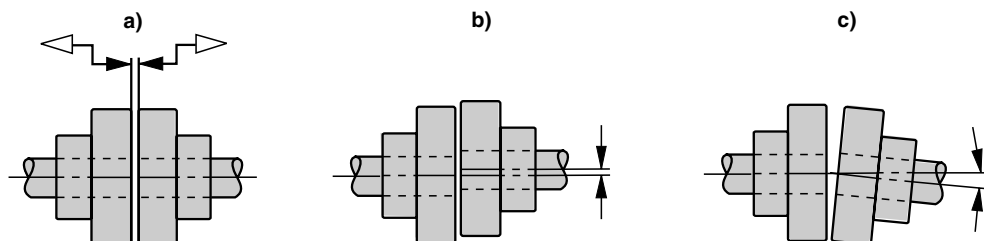
Mechanical Installation

Gear unit with solid shaft

Installing couplings

Couplings must be mounted and balanced according to the information provided by the coupling manufacturer:

- a) Maximum and minimum clearance
- b) Axial misalignment
- c) Angular misalignment



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Figure 7: Clearance and misalignment for coupling installation



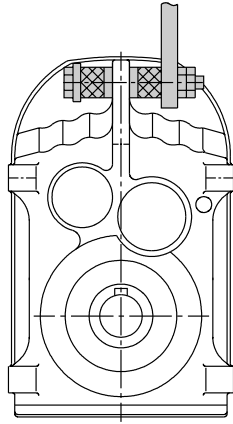
Input and output elements such as belt pulleys, couplings, etc. must be protected against contact!



4.5 Torque arms for mounted gear units

Do not place torque arms under strain during installation!

**Parallel shaft
helical gear units**

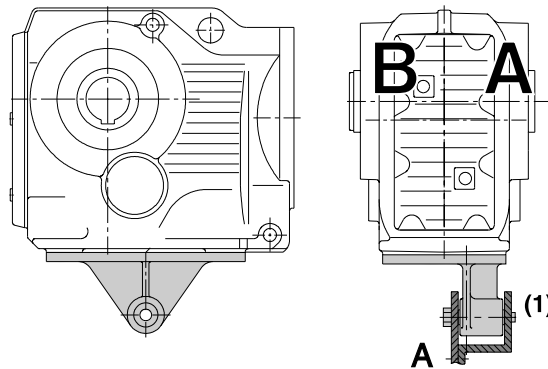


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Figure 8: Torque arm for parallel shaft helical gear units

**Helical-bevel gear
units**

- Bush with bearings on both ends → (1).
- Install connection end B as a mirror image of A.



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Figure 9: Torque arm for helical-bevel gear units

Gear unit	Bolts	Tightening torque
KA37	4 × M10 × 25 – 8.8	48 Nm
KA47	4 × M10 × 30 – 8.8	48 Nm
KA67	4 × M12 × 35 – 8.8	86 Nm
KA77	4 × M16 × 40 – 8.8	210 Nm
KA87	4 × M16 × 45 – 8.8	210 Nm
KA97	4 × M20 × 50 – 8.8	410 Nm
KA107	4 × M24 × 60 – 8.8	710 Nm
KA127	4 × M36 × 130 – 8.8	2500 Nm
KA157	4 × M36 × 130 – 8.8	2500 Nm

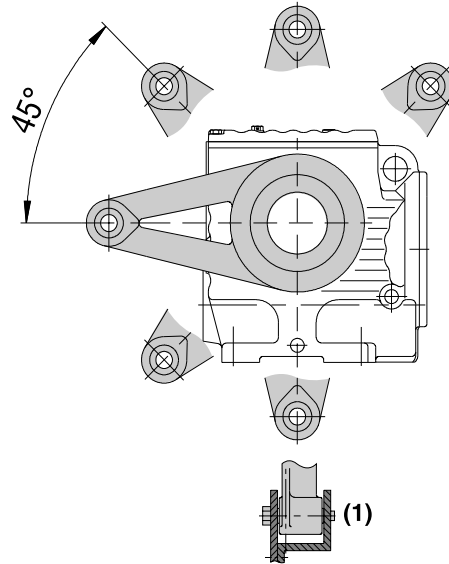


Mechanical Installation

Torque arms for mounted gear units

Helical-worm gear units

- Bush with bearings on both ends → (1).



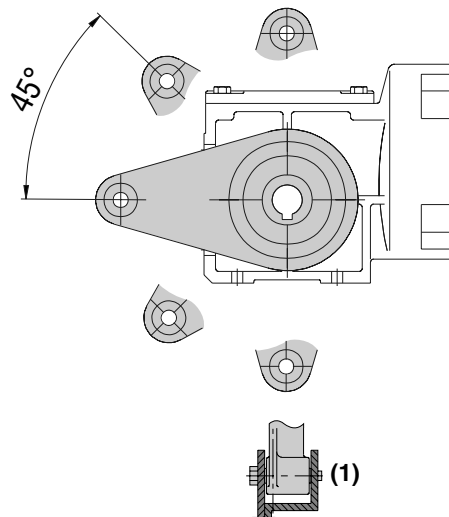
01031CXX

Figure 10: Torque arm for helical-worm gear units

Gear unit	Bolts	Tightening torque
SA37	M6 × 16 – 8.8	11 Nm
SA47	M8 × 20 – 8.8	25 Nm
SA57	M8 × 20 – 8.8	25 Nm
SA67	M12 × 25 – 8.8	86 Nm
SA77	M12 × 35 – 8.8	86 Nm
SA87	M16 × 35 – 8.8	210 Nm
SA97	M16 × 35 – 8.8	210 Nm

SPIROPLAN® W gear units

- Bush with bearings on both ends → (1)



02050CXX

Figure 11: Torque arm for SPIROPLAN® W gear units

Gear unit	Bolts	Tightening torque
WA10	M6 × 16	11 Nm
WA20	M6 × 16	11 Nm
WA30	M6 × 16	11 Nm



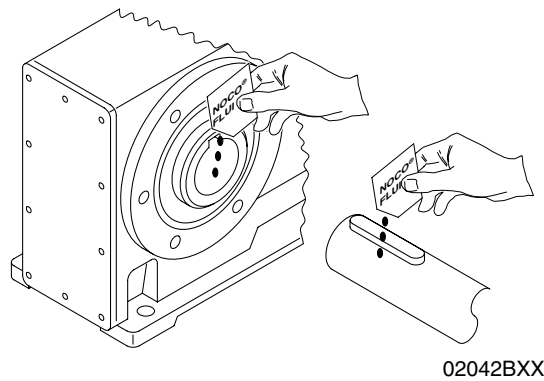
4.6 Mounted gear unit with keyway or splined hollow shaft



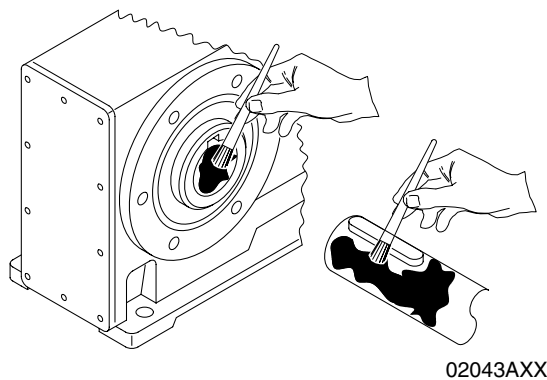
For the configuration of customer shafts, please also refer to the design notes in the Gearmotors catalog!

Installation notes

1. Apply NOCO® fluid.

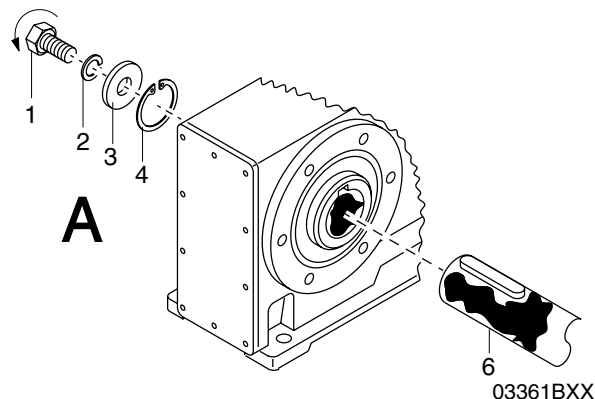


2. Distribute the NOCO® fluid carefully.



3. Install the shaft and secure it axially
(mounting is facilitated by using a mounting device)

3A: Mounting with standard scope of delivery



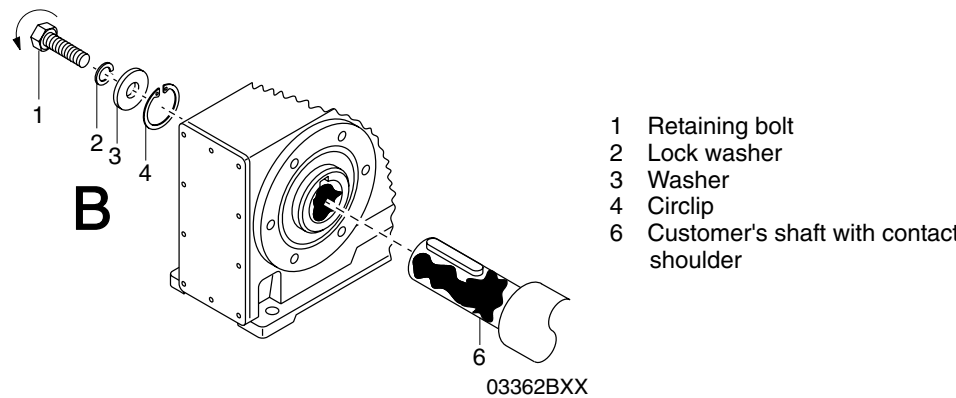
- 1 Short retaining bolt
(standard scope of delivery)
- 2 Lock washer
- 3 Washer
- 4 Circlip
- 6 Customer shaft



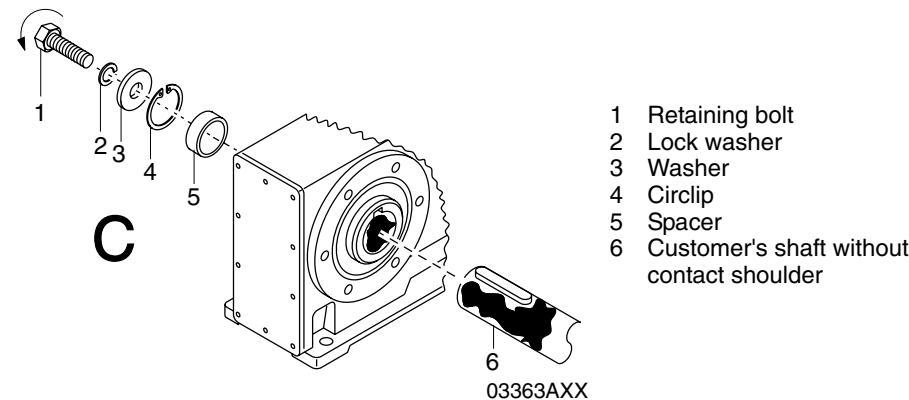
Mechanical Installation

Mounted gear unit with keyway or splined hollow shaft

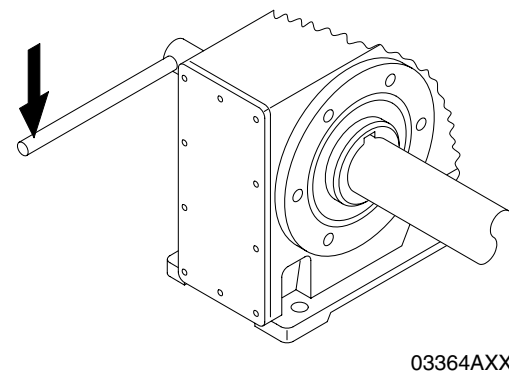
3B: Assembly with SEW-EURODRIVE assembly/disassembly kit (→ page 26)
 – Customer's shaft **with** contact shoulder



3C: Assembly with SEW-EURODRIVE assembly/disassembly kit (→ page 26)
 – Customer's shaft **without** contact shoulder



4. Tighten the retaining bolt to the appropriate torque (see table).



Bolt	Tightening torque [Nm]
M5	5
M6	8
M10/12	20
M16	40
M20	80
M24	200



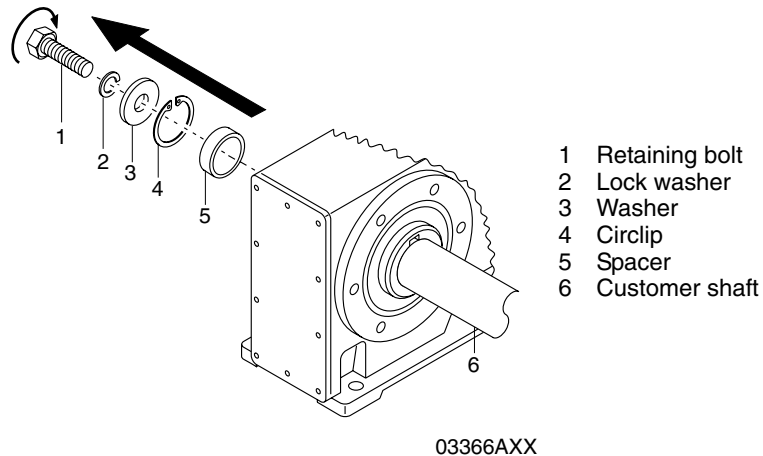
Note:
 To avoid contact corrosion, we recommend that the customer's shaft should additionally be recessed between the two contact surfaces!



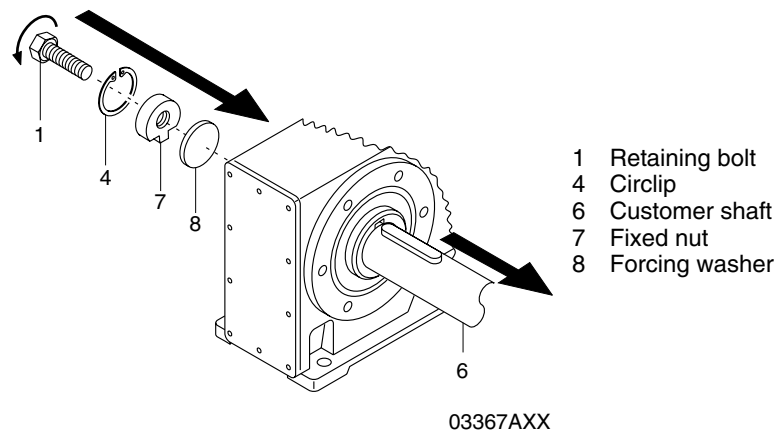
Removal notes

This description is only applicable when the gear unit was assembled using the installation/removal kit from SEW-EURODRIVE(→ page 26) (see the previous description, point 3B or 3C).

1. Loosen the retaining bolt [1].
2. Remove parts 2 to 4 and, if fitted, spacer 5.



3. Insert the forcing washer [8] and the fixed nut [7] from the SEW-EURODRIVE installation/removal kit between the customer's shaft [6] and the circlip [4].
4. Re-insert the circlip [4].
5. Screw the retaining bolt [1] back in. Now you can force the gear unit off the shaft by tightening the bolt.



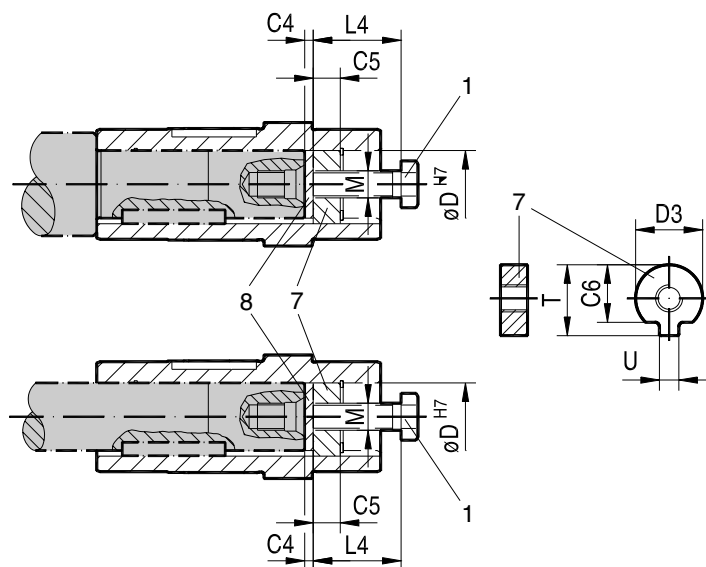


Mechanical Installation

Mounted gear unit with keyway or splined hollow shaft

SEW installation/removal kit

The SEW-EURODRIVE installation/removal kit can be ordered under the following part number.



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Figure 12: SEW-EURODRIVE installation/removal kit

- 1 Retaining bolt
- 7 Fixed nut for disassembly
- 8 Forcing washer

Type	D ^{H7} [mm]	M ¹⁾	C4 [mm]	C5 [mm]	C6 [mm]	U ^{-0.5} [mm]	T ^{-0.5} [mm]	D3 ^{-0.5} [mm]	L4 [mm]	Part number of installa- tion/removal kit
WA..10	16	M5	5	5	12	4.5	18	15.7	50	643 712 5
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643,682 X
WA..20, WA..30, SA..37	20	M6	5	6	15.5	5.5	22.5	19.7	25	643 683 8
FA..27, SA..47	25	M10	5	10	20	7.5	28	24.7	35	643 684 6
FA..37, KA..37, SA..47, SA..57	30	M10	5	10	25	7.5	33	29.7	35	643 685 4
FA..47, KA..47, SA..57	35	M12	5	12	29	9.5	38	34.7	45	643 686 2
FA..57, KA..57, FA..67, KA..67, SA..67	40	M16	5	12	34	11.5	41.9	39.7	50	643 687 0
SA..67	45	M16	5	12	38.5	13.5	48.5	44.7	50	643 688 9
FA..77, KA..77, SA..77	50	M16	5	12	43.5	13.5	53.5	49.7	50	643 689 7
FA..87, KA..87, SA..77, SA..87	60	M20	5	16	56	17.5	64	59.7	60	643 690 0
FA..97, KA..97, SA..87, SA..97	70	M20	5	16	65.5	19.5	74.5	69.7	60	643 691 9
FA..107, KA..107, SA..97	90	M24	5	20	80	24.5	95	89.7	70	643 692 7
FA..127, KA..127	100	M24	5	20	89	27.5	106	99.7	70	643 693 5
FA..157, KA..157	120	M24	5	20	107	31	127	119.7	70	643 694 3

1) Retaining bolt

The SEW assembly kit for mounting the customer shaft is a recommendation from SEW-EURODRIVE. You must always check whether this design can compensate the axial loads. In particular applications (e.g. mounting mixer shafts), a different design may have to be used to secure the shaft axially. In these cases, customers can use their own devices. However, you must ensure that these designs do not cause potential sources of combustion according to DIN EN 13463 (for example, impact sparks).

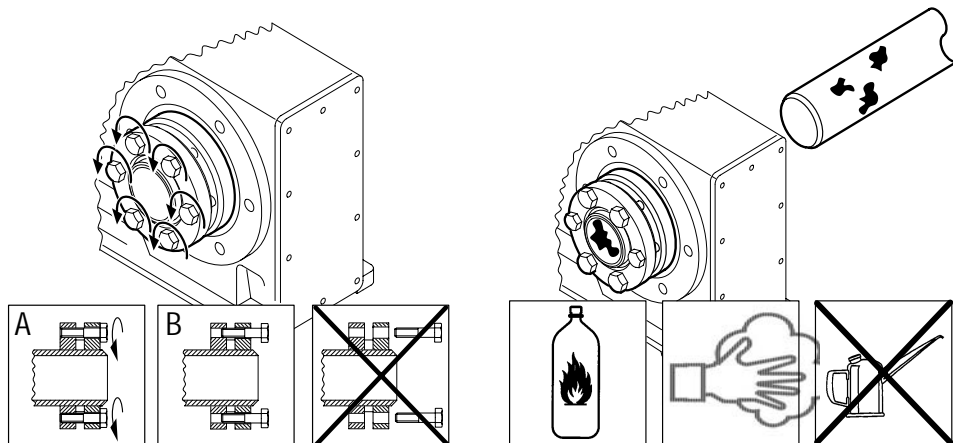


4.7 Mounted gear units with shrink disc

Installation notes

- Do not tighten the locking bolts unless the shaft is installed - the hollow shaft could become deformed!

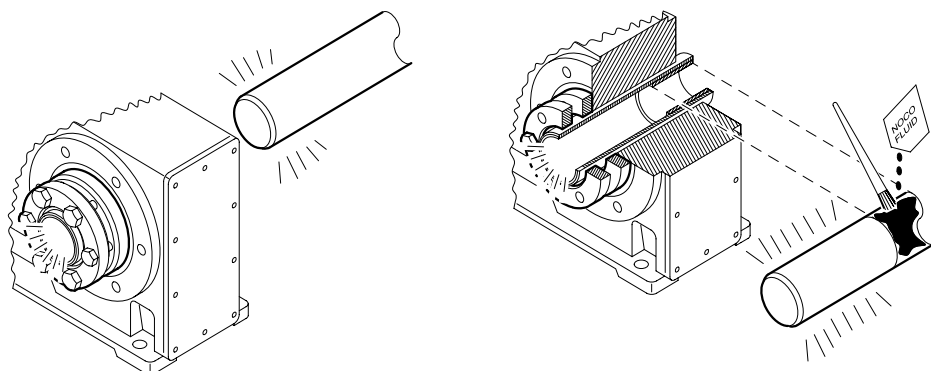
- Loosen the locking bolts by a few turns (do not unscrew them completely!).
- Carefully degrease the hollow shaft hole and the input shaft.



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- Hollow shaft/input shaft after degreasing
- Apply NOCO® fluid to the input shaft¹⁾ in the area of the bushing.



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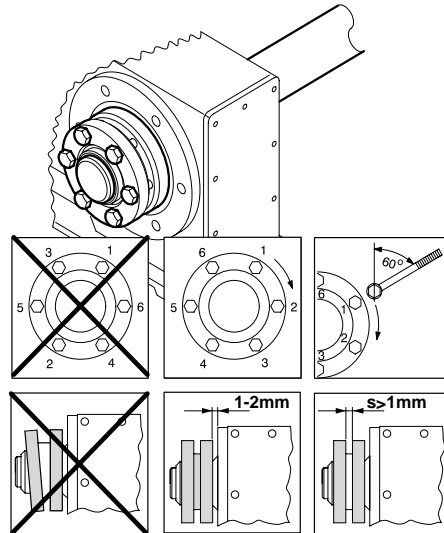
- It is essential to make sure that the clamping area of the shrink disc is free from grease!
For this reason, never apply NOCO® fluid directly to the bushing as the paste may be able to get into the clamping area of the shrink disc when the input shaft is put on.



Mechanical Installation

Mounted gear units with shrink disc

5. Install the input shaft, making sure that the locking collars of the shrink disc are installed in parallel to each other²⁾. For gear unit housing **with a shaft collar**, mount the **shrink disc to the stop on the shaft collar**. For gear unit housing **without a shaft collar**, mount the **shrink disc with a clearance of 1 to 2 mm from the gear unit housing**. Tighten the locking bolts with the torque wrench by working round several times from one bolt to the next (not in diametrically opposite sequence) until the bolts cannot be tightened any more. See the following table for tightening torques.



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²⁾ After installation

- There must be a gap $s > 1 \text{ mm}$ between the locking collars
- Grease the outside of the hollow shaft in the area of the shrink disc to prevent corrosion.

Gear unit type			Bolt	Nm	\angle max. ¹⁾
SH37			M5	5	60°
KH37...77	FH37...77	SH47...77	M6	12	
KH87/97	FH87/97	SH87/97	M8	30	
KH107	FH107		M10	59	
KH127/157	FH127		M12	100	
KH167			M16	250	
KH187			M20	470	

1) Maximum tightening angle per cycle



**Notes on
removing the
shrink disk**

1. Unscrew the locking bolts evenly one after the other. Each locking bolt may only be unscrewed by about one quarter turn in the initial cycle. This is in order to avoid tilting and jamming the locking collars. Do not fully unscrew the locking bolts!
2. Remove the shaft or pull the hub off the shaft. (You must first remove any rust that may have formed between the hub and the end of the shaft.)
3. Pull the shrink disk off the hub.



Caution!

Risk of injury if the shrink disk is not removed correctly!

**Cleaning and
lubricating the
shrink disk**

There is no need to strip down and re-grease disassembled shrink disks before they are screwed back on.

The shrink disk only needs to be cleaned and re-greased if it is contaminated.

Use one of the following solid lubricants for the tapered surfaces.

Lubricant (Mo S2)	Sold as
Molykote 321 (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or paste
Aemasol MO 19P	Spray or paste
Aemasol DIO-sétral 57 N (lube coat)	Spray

Grease the locking bolts with a multipurpose grease such as Molykote BR 2 or similar.

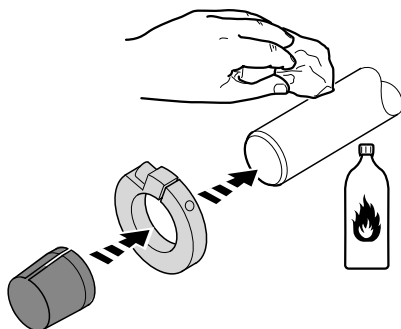


Mechanical Installation

Mounted gear units with TorqLOC®

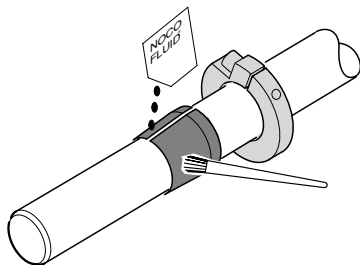
4.8 Mounted gear units with TorqLOC®

1. Clean the inside of the hollow shaft and the customer shaft. Ensure that all traces of grease or oil are removed.
2. Install the split ring and the bushing on the customer shaft.



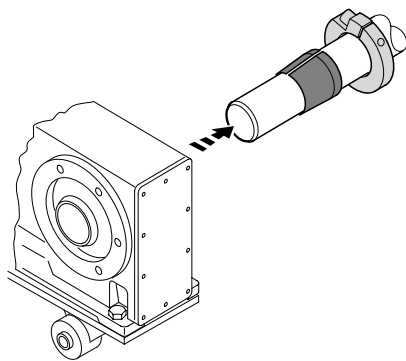
52089AXX

3. Apply NOCO® fluid to the bushing and distribute it carefully.



52090AXX

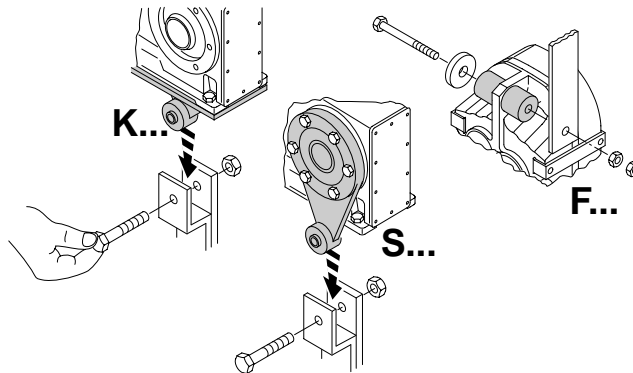
4. Push the gear unit onto the customer shaft.



52091AXX

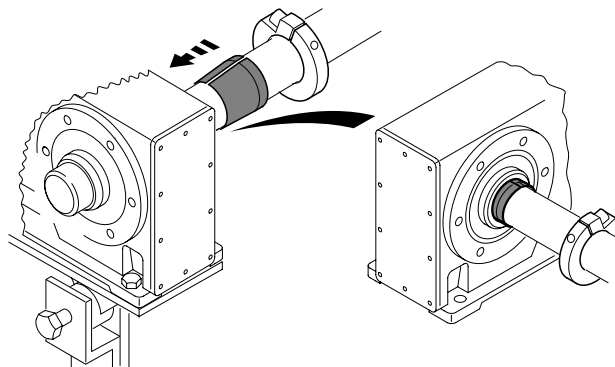


5. Preassemble the torque arm (do not tighten the bolts).



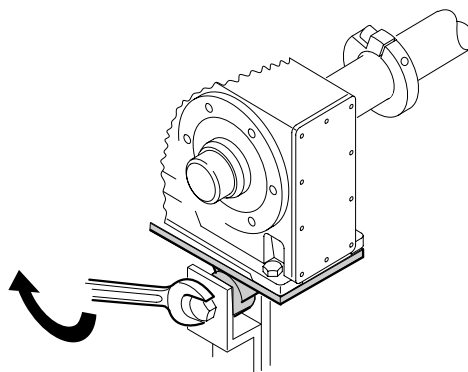
52092AXX

6. Push the busing onto the gear unit up to the stop.



52093AXX

7. Tighten all the retaining bolts for the torque arm.



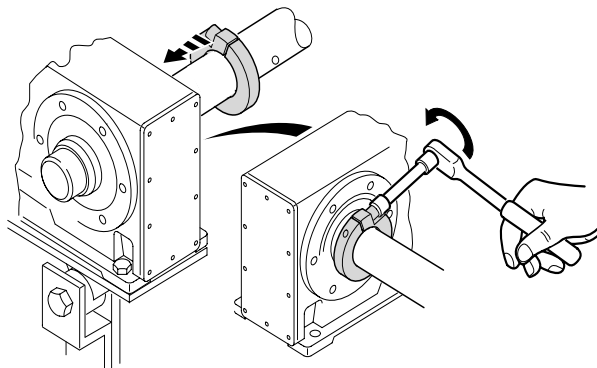
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Mechanical Installation

Mounted gear units with TorqLOC®

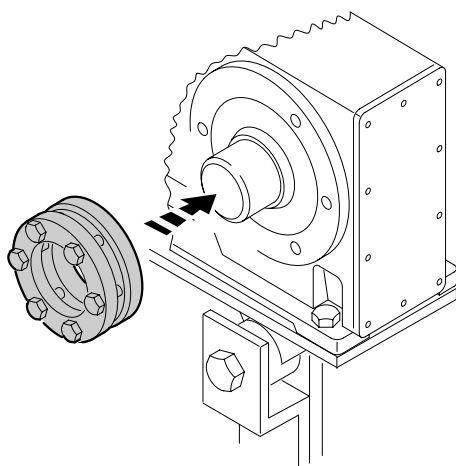
8. Secure the bushing with the split ring. Tighten the split ring on the bushing using the appropriate torque as specified in the following table.



52095AXX

Type		Torque [Nm]	
KT/FT	ST	Nickel plated	Stainless steel
-	37	18	7.5
37	47	18	7.5
47	57	18	7.5
57, 67	67	35	18
77	77	35	18
87	87	35	18
97	97	35	18

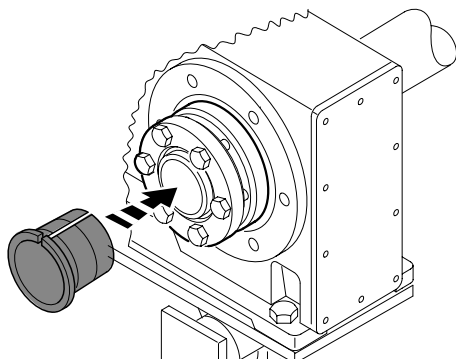
9. Slide the shrink disk onto the hollow shaft. Ensure that all bolts have been loosened.



52096AXX

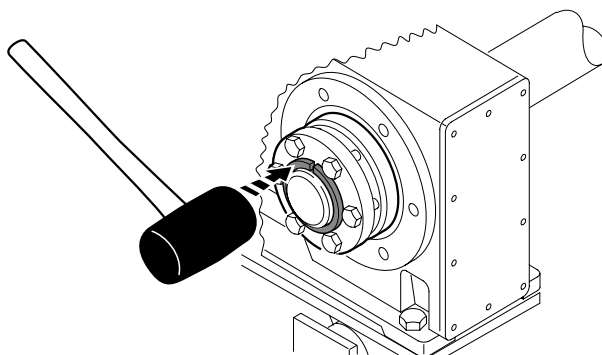


10. Push the counter bushing onto the customer shaft and into the hollow shaft or shrink disk right into the seat.



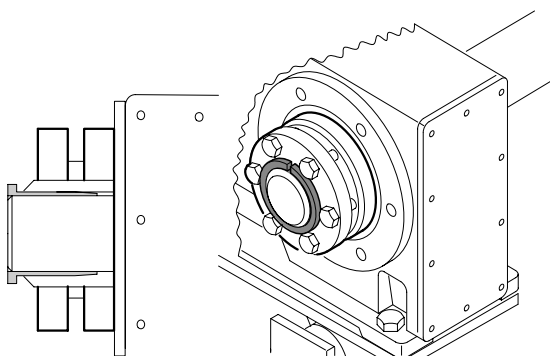
52097AXX

11. Tap lightly on the flange of the counter bushing to ensure that the socket is fitted securely in the hollow shaft.



52098AXX

12. Ensure that the customer shaft is fitted in the counter bushing.



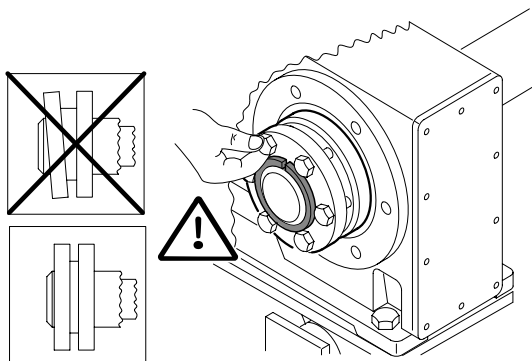
53478AXX



Mechanical Installation

Mounted gear units with TorqLOC®

13. Tighten the bolts of the shrink disk by hand and ensure that the end rings of the shrink disk are parallel.

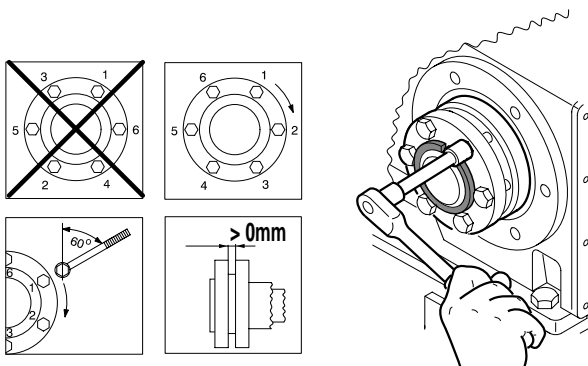


52100AXX

14. Tighten the locking bolts by working round several times from one bolt to the next (not in diametrically opposite sequence). See the table for tightening torques.



After installation, the remaining gap between the outer rings of the shrink discs must be > 0 mm.

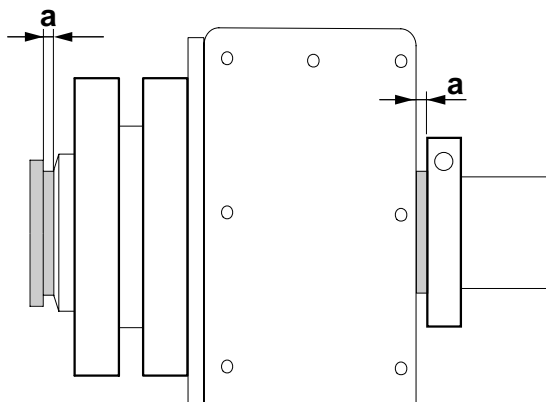


52101AXX

Type		Nickel plated	Stainless steel
KT/FT	ST	Torque [Nm]	
-	37	4.1	6.8
37	47	10	6.8
47	57	12	6.8
57, 67	67	12	15
77	77	30	30
87	87	30	50
97	97	30	50



15. The distance between the counter bushing and the hollow shaft end and between the split ring and the clamping ring must not exceed the following values. The following table lists the maximum and minimum gap width.



52102AXX

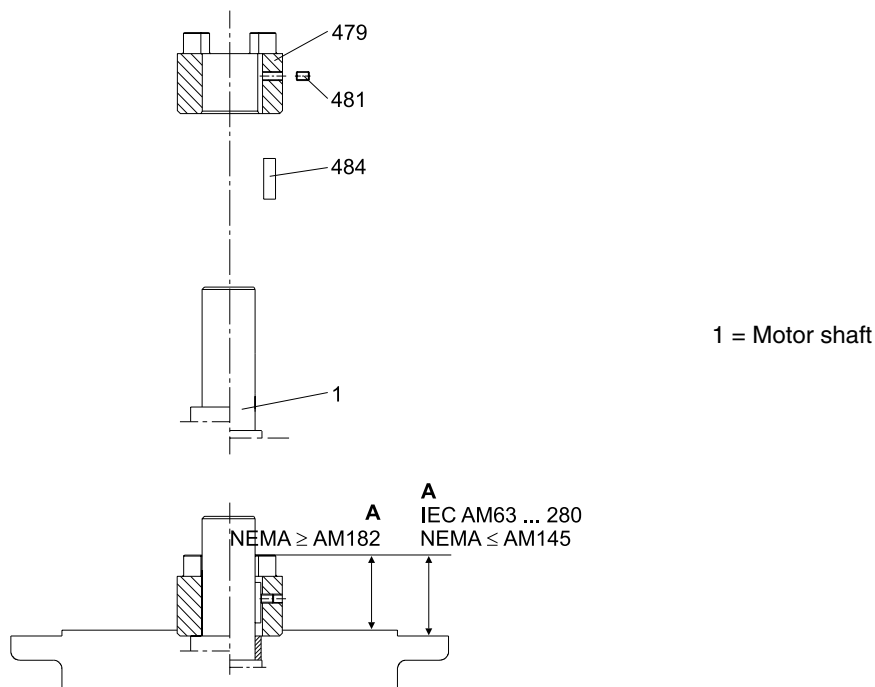
Type		Distance [mm]	
KT/FT	ST	a min.	a max.
-	37	3.3	5.6
37	47	3.3	5.6
47	57	5.0	7.6
57, 67	67	5.0	7.6
77	77	5.0	7.6
87	87	5.8	8.6
97	97	5.8	8.6



4.9 AM adapter coupling

IEC adapter AM63
225 / NEMA
adapter AM56
365

04469CXX



1 = Motor shaft

1. Clean the motor shaft and flange surfaces of the motor and adapter.
2. Remove the key from the motor shaft and replace it with the supplied key (484) (not AM63 and AM250).
3. Heat the coupling half (479) to approx. 80 – 100 °C, push the coupling half onto the motor shaft.
 Until stop at motor shaft shoulder (position to point **A** except for AM25 / AM280 and NEMA).
4. Secure key and coupling half using grub screw (481) and tightening torque T_A on motor shaft according to the table.
5. Check point **A**.
6. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
7. Mount the motor on the adapter. When doing this, make sure the coupling dogs of the adapter shaft engage in the plastic spider.

IEC AM	63 / 71	80 / 90	100 / 112	132	160 / 180	200	225	250 / 280
A	24.5	31.5	41.5	54	76	78.5	93.5	139
T_A	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10
NEMA AM	56	143 / 145	182 / 184	213 / 215	254 / 256	284 / 286	324 / 326	364 / 365
A	46	43	55	63.5	78.5	85.5	107	107
T_A	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10



To avoid contact corrosion, we recommend applying NOCO® fluid to the motor shaft before mounting the coupling half.

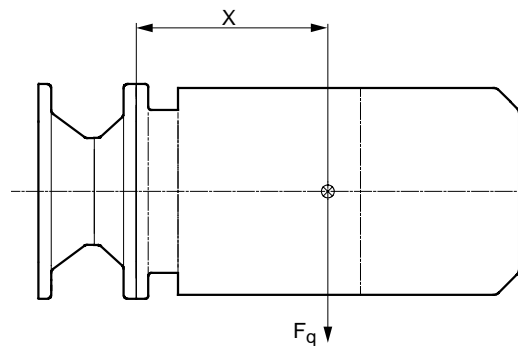


When installing a motor onto the adapter, you must use an anaerobic fluid seal to ensure that moisture cannot penetrate the adapter.

Permitted loads



The load data specified in the following table must not be exceeded when a motor is mounted.



51102AXX

Adapter type		x ¹⁾ [mm]	F _q ¹⁾ [N]	
IEC	NEMA		IEC adapter	NEMA adapter
AM63/71	AM56	77	530	410
AM80/90	AM143/145	113	420	380
AM100/112	AM182/184	144	2000	1760
AM132 ²⁾	AM213/215 ²⁾	186	1600	1250
AM132..	AM213/215		4700	3690
AM160/180	AM254/286	251	4600	4340
AM200/225	AM324 - AM365	297	5600	5250
AM250/280	-	390	11200	-

1) The maximum permitted weight of the attached motor $F_{q\max}$ must be reduced proportionally as the distance between the adapter flange and the middle of the motor (x) increases. When this distance is reduced, the maximum permitted weight $F_{q\max}$ cannot be increased.

2) Diameter of the adapter drive flange: 160 mm



Mechanical Installation

AQ adapter coupling

Adapter AM with
backstop AM../RS

Check the direction of rotation of the drive before installation and startup. Please inform the SEW-EURODRIVE customer service if the direction of rotation is incorrect.

The backstop is maintenance-free in operation, and does not require any further maintenance work.

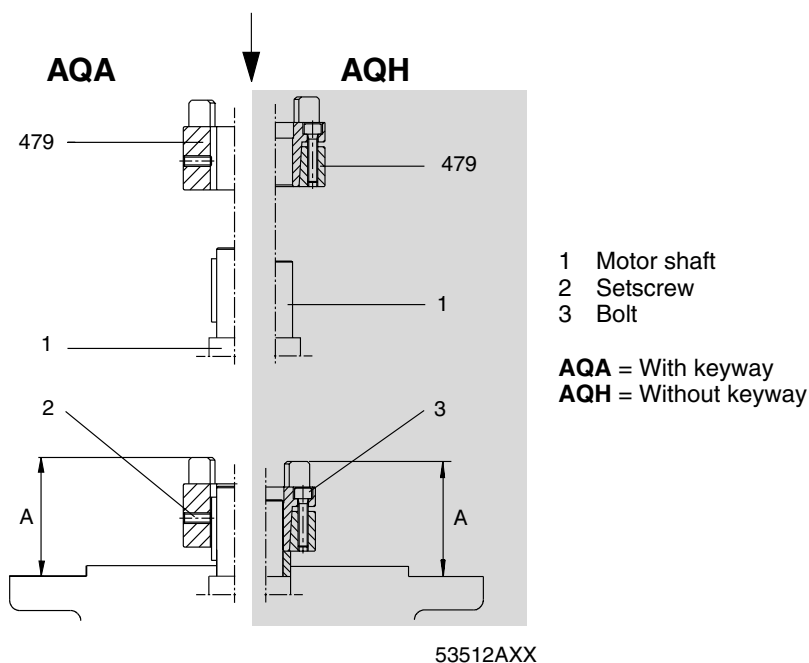
The backstops have a minimum lift-off speed depending on the size (→ following table). If the minimum lift-off speeds are violated, the backstops are subject to wear, and the resulting friction causes the temperature to increase.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [1/min]
AM80/90/RS, AM143/145/RS	90	640
AM100/112/RS, AM182/184/RS	340	600
AM132/RS, AM213/215/RS	700	550
AM160/180/RS, AM254/286/RS	1200	630
AM200/225/RS, AM324-365/RS	1450	430



In rated operation, the lift-off speeds must not drop below the minimum values. The lift-off speeds are only permitted to drop below the minimum values during start-up or braking.

4.10 AQ adapter coupling



1. Clean the motor shaft and flange surfaces of the motor and adapter.
2. **Type AQH:** Unscrew the bolts of the coupling half (479) and loosen the conical connection.
3. Heat the coupling half (80 °C – 100 °C) and push it onto the motor shaft.
Type AQA / AQH: Up to clearance "A" (see table).
4. **Type AQH:** Tighten the bolts on the coupling half in diametrically opposite sequence



(work round several times tightening the bolts evenly one after the other) until all bolts reach the tightening torque T_A specified in the table.

Type AQA: Use a setscrew to secure the coupling half (see table).

5. Check the position of the coupling half (clearance "A", see table).

Install motor onto the adapter making sure that the dogs of the two coupling halves engage in each other. The force that must be applied when joining the two coupling halves is dissipated after final assembly, so there is no risk of any axial load being applied to adjacent bearings.



Only for AQA, not permitted for AQH: To avoid contact corrosion, we recommend applying NOCO[®] fluid to the motor shaft before mounting the coupling half.



When installing a motor onto the adapter, you must use an anaerobic fluid seal to ensure that moisture cannot penetrate the adapter.

Setting dimensions, tightening torques

Type	Coupling size	Clearance "A" [mm]	Bolts DIN 912		Tightening torque T_A [Nm]	
			AQA	AQH	AQA	AQH
AQA /AQH 80 /1/2/3	19/24	44,5	M5	M4	2	3
AQA /AQH 100 /1/2		39				
AQA /AQH 100 /3/4		53				
AQA /AQH 115 /1/2		62				
AQA /AQH 115 /3	24/28	62	M5	M5	2	6
AQA /AQH 140 /1/2		62				
AQA /AQH 140 /3	28/38	74,5	M8	M5	10	6
AQA /AQH 190 /1/2		76,5				
AQA /AQH 190 /3	38/45	100	M8	M6	10	10

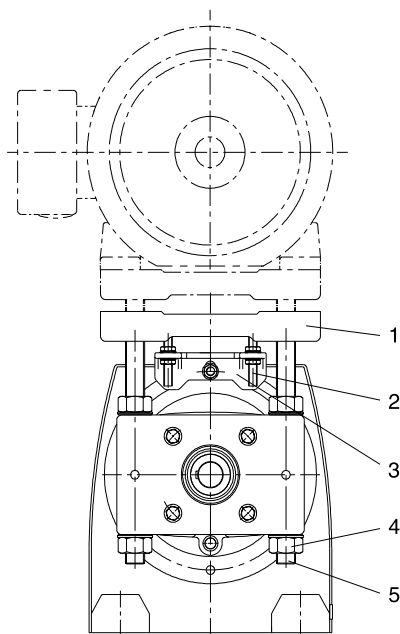


4.11 AD input shaft assembly

Please refer to Sec. "Installing input and output shafts" for information on mounting of input elements.

Cover with motor mounting platform AD../P

Mounting the motor and adjusting the motor mounting platform.



- 1 Motor mounting platform
- 2 Stud bolt (only AD6/P / AD7/P)
- 3 Support (only AD6/P / AD7/P)
- 4 Nut
- 5 Threaded column

03519BXX

1. Set the motor mounting platform to the required mounting position by evenly tightening the adjusting nuts. It may be necessary to remove the lifting eyebolt from helical gear units in order to achieve the lowest adjustment position. Touch up any damage to the paint work.
2. Align the motor on the motor mounting platform (shaft ends must be in alignment) and secure it.
3. Mount the input elements on the input shaft end and the motor shaft. Line them up with one another. Correct the motor position again if necessary.
4. Put on traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor mounting platform. Do not stress the motor mounting platform and the columns against one another when doing this.
5. Tighten the threaded columns using the nuts which are not used for adjustment.

Only AD6/P and AD7/P:

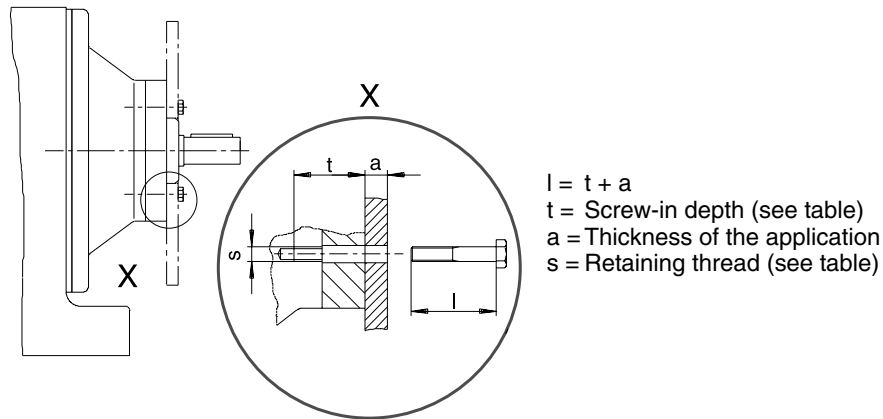
Unscrew the nuts on the stud bolts before adjustment to allow the stud bolts to move axially in the support without restriction. Do not tighten the nuts until the final adjustment position has been achieved. Do not adjust the motor mounting platform using the support.



Type with centering shoulder
AD../ZR

Mounting applications on the input shaft assembly with centering shoulder.

1. Retaining bolts of a suitable length must be used to secure the application. The length l of the new bolts is calculated as follows:



02725CXX

Round down the calculated bolt length to the next smaller standard length.

2. Remove the retaining bolts from the centering shoulder.
3. Clean the contact surface and the centering shoulder.
4. Clean the threads of the new bolts and apply a bolt locking compound (e.g. Loctite 243) to the first few threads.
5. Position the application against the centering shoulder and tighten the retaining bolts to the specified tightening torque T_A (see table).

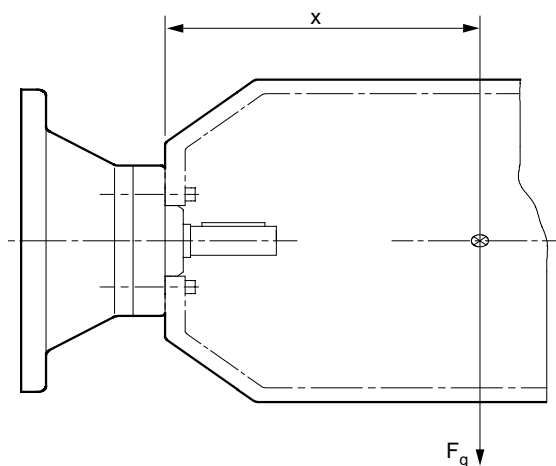
Type	Screw-in depth t [mm]	Retaining thread s	Tightening torque T_A for connection bolts in strength class 8.8 [Nm]
AD2/ZR	25,5	M8	25
AD3/ZR	31,5	M10	48
AD4/ZR	36	M12	86
AD5/ZR	44	M12	86
AD6/ZR	48,5	M16	210
AD7/ZR	49	M20	410
AD8/ZR	42	M12	86



Permitted loads



The load values specified in the following table must not be exceeded.



53513AXX

Type	$x^1)$ [mm]	$F_q^{1)}$ [N]
AD2/ZR	193	330
AD3/ZR	274	1400
AD4/ZR ²⁾	361	1120
AD4/ZR		3300
AD5/ZR	487	3200
AD6/ZR	567	3900
AD7/ZR	663	10000
AD8/ZR	516	4300

1) Maximum load values for connection bolts in strength class 8.8. The maximum permitted weight of the attached motor F_{qmax} must be reduced proportionally as the distance between the adapter flange and the middle of the motor (x) increases. When this distance is reduced, the F_{qmax} cannot be increased.

2) Diameter of the adapter output flange: 160 mm



Cover with backstop AD../RS

Check the direction of rotation of the drive before installation and startup. Please inform the SEW-EURODRIVE customer service if the direction of rotation is incorrect.

The backstop is maintenance-free in operation, and does not require any further maintenance work.

The backstops have a minimum lift-off speed depending on the size (→ following table). If the minimum lift-off speeds are violated, the backstops are subject to wear, and the resulting friction causes the temperature to increase.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [1/min]
AD2/RS	90	640
AD3/RS	340	600
AD4/RS	700	550
AD5/RS	1200	630
AD6/RS	1450	430
AD7/RS	1450	430
AD8/RS	2860	430



In rated operation, the lift-off speeds must not drop below the minimum values. The lift-off speeds are only permitted to drop below the minimum values during start-up or braking.



Startup

Startup of helical-worm and SPIROPLAN® W gear units

5 Startup



Prior to startup check that the oil level is as specified for the mounting position. The oil checking and drain screws and the breather valves must be freely accessible.

5.1 Startup of helical-worm and SPIROPLAN® W gear units



Note: The direction of rotation of the output shaft in series S..7 helical-worm gear units has been changed from CW to CCW; this is different from the S..2 series. Change direction of rotation: Swap over two motor feeder cables.

Run-in period

SPIROPLAN® and helical-worm gear units require a run-in period of at least 24 hours before reaching their maximum efficiency. A separate run-in period applies for each direction of rotation if the gear unit is operated in both directions of rotation. The table shows the average power reduction during the run-in period.

No. of starts	Worm		Spiroplan®	
	Power reduction	i range	Power reduction	i range
1 start	ca. 12 %	ca. 50...280	ca. 15 %	approx. 40 ... 75
2 start	ca. 6 %	ca. 20...75	ca. 10 %	ca. 20...30
3 start	ca. 3 %	ca. 20...90	ca. 8 %	ca. 15
4 start	-	-	ca. 8 %	ca. 10
5 start	ca. 3 %	ca. 6...25	ca. 5 %	ca. 8
6 start	ca. 2 %	ca. 7...25	-	-

5.2 Startup of helical, parallel shaft helical and helical-bevel gear units

No special startup instructions are required for helical, parallel shaft helical and helical-bevel gear units providing the gear units have been installed in accordance with Sec. "Mechanical Installation".

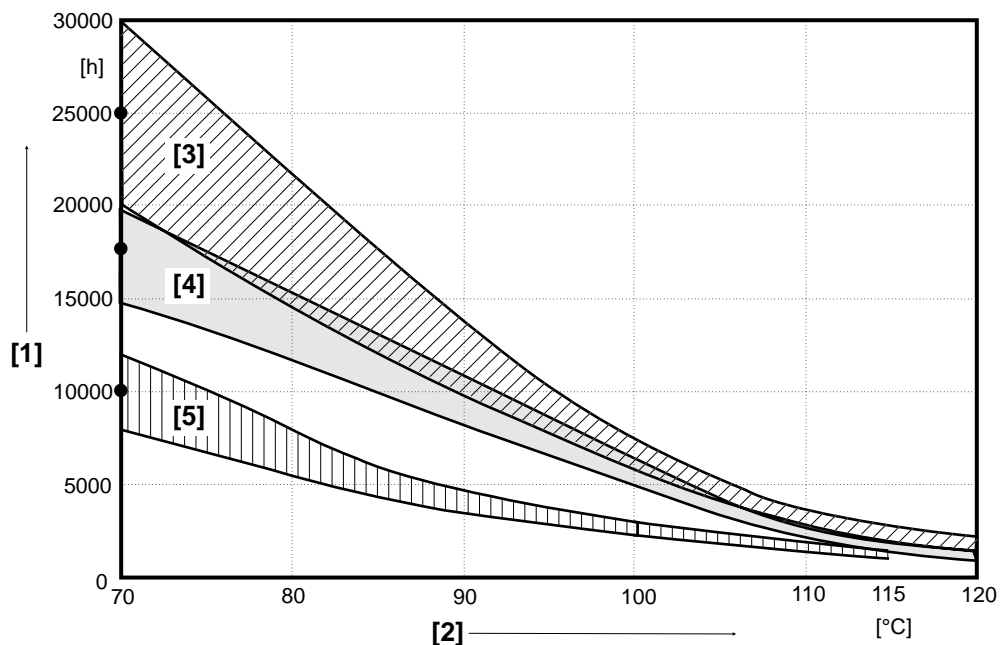


6 Inspection and Maintenance

6.1 Inspection and maintenance intervals

Frequency	What to do?
<ul style="list-style-type: none"> Every 3000 machine hours, at least every 6 months. 	<ul style="list-style-type: none"> Check oil and oil level. Check the seals visually for leakage. For gear units with a torque arm: Check the rubber buffer and change it, if necessary
<ul style="list-style-type: none"> Depending on the operating conditions (see chart below), every 3 years at the latest. According to oil temperature. 	<ul style="list-style-type: none"> Change mineral oil. Replace anti-friction bearing grease (recommendation). Replace oil seal (do not install it in the same track).
<ul style="list-style-type: none"> Depending on the operating conditions (see chart below), every 5 years at the latest. According to oil temperature. 	<ul style="list-style-type: none"> Change synthetic oil Replace anti-friction bearing grease (recommendation). Replace oil seal (do not install it in the same track).
<ul style="list-style-type: none"> Gear units R07, R17, R27, F27 and Spiroplan® are have lubrication for life and are therefore maintenance-free 	
<ul style="list-style-type: none"> Varying (depending on external factors). 	<ul style="list-style-type: none"> Touch up or renew the surface/anticorrosion coating.

6.2 Lubricant change intervals



53232AXX

Figure 13: Oil change intervals for standard gear units under normal environmental conditions

[1] Operating hours

[2] Sustained oil bath temperature

- Average value per oil type at 70 °C

[3] CLP PG

[4] CLP HC / HCE 

[5] CLP / HLP / E 



6.3 Inspection and maintenance of the gear unit

Do not intermix synthetic lubricants and do not mix synthetic and mineral lubricants together!

The standard lubricant is mineral oil (except for Spiroplan® gear units).

The position of the oil level and oil drain plug and the breather valve depends on the mounting position. Refer to the diagrams of the mounting positions.

Checking the oil level



1. **De-energize the gearmotor and secure it to prevent it from being switched on inadvertently!**

Wait until the gear unit has cooled off – Danger of burns!

2. Refer to Sec. "Installing the gear unit" when changing the mounting position!
3. For gear units with an oil level plug: Remove the oil level plug, check the fill level and correct it if necessary. Screw the oil level plug back in.

Checking the oil



1. **De-energize the gearmotor and secure it to prevent it from being switched on inadvertently!**

Wait until the gear unit has cooled off – Danger of burns!

2. Remove a little oil from the oil drain plug.
3. Check the oil consistency.
 - Viscosity
 - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance periods".
4. For gear units with an oil level plug: Remove the oil level plug, check the fill level and correct it if necessary. Screw the oil level plug back in.

Changing the oil



Only change the oil when the gear unit is at operating temperature.

De-energize the gearmotor and secure it to prevent it from being switched back on inadvertently!

Wait until the gear unit cools down - Danger of burns!

Note: The gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

With oil drain plug / oil level screw

1. Place a container underneath the oil drain plug
2. Remove the oil level plug, breather plug/breather valve and oil drain plug.
3. Drain all the oil.
4. Screw in the oil drain plug.
5. Pour in new oil of the same type through the vent hole (if changing the oil type, please first contact our customer service). Do not mix synthetic lubricants.
 - Pour in the volume of oil in accordance with the mounting position (see Sec. "Lubricant fill quantities") or as specified on the nameplate.
 - Check at the oil level plug.
6. Screw the oil level plug back in
7. Screw in the breather plug/breather valve.



Without oil drain plug / oil level plug

1. Remove cover plate.
2. Drain the oil through the cover plate opening.
3. Pour in new oil of the same type through the vent hole (if changing the oil type, please first contact our customer service). Do not mix synthetic lubricants.
 - Pour in the volume of oil in accordance with the mounting position (see Sec. "Lubricant fill quantities") or as specified on the nameplate.
4. Check the oil level (→ Sec. "Check oil level for gear units with oil level plug")
5. Attach cover plate (observe the tightening torque and series → Sec. "Check the oil level for gear units without an oil level plug")

Changing the oil seal



1. **De-energize the gearmotor and secure it to prevent it from being switched on inadvertently!**
Wait until the gear unit has cooled off – Danger of burns!
2. When changing the oil seal, ensure that there is a sufficient grease reservoir between the dust lip and protective lip, depending on the type of gear unit.
3. If you use double oil seals, the space has to be filled one-third with grease.

6.4 Inspection / maintenance of AM / AQA adapters

Frequency	What to do?
<ul style="list-style-type: none"> Every 3000 machine hours, at least every 6 months 	<ul style="list-style-type: none"> Check torsional play Visually check the elastic annular gear Check the adapter visually for leakage
<ul style="list-style-type: none"> After 25000 - 30000 machine hours 	<ul style="list-style-type: none"> Renew the anti-friction bearing grease Replace oil seal (do not install it in the same track) Change the elastic annular gear.

6.5 Inspection / maintenance of AD adapters

Frequency	What to do?
<ul style="list-style-type: none"> Every 3000 machine hours, at least every 6 months 	<ul style="list-style-type: none"> Check running noise for possible bearing damage Check the adapter visually for leakage
<ul style="list-style-type: none"> After 25000 - 30000 machine hours 	<ul style="list-style-type: none"> Renew the anti-friction bearing grease Change the oil seal



7 Malfunctions

Customer service

Please have the following information to hand if you require the assistance of our customer service:

- Data from the nameplate (complete)
- Nature and extent of the fault
- Time and peripheral circumstances of the fault
- Presumed cause

7.1 Gear unit malfunctions

Problem	Possible cause	Remedy
Unusual, regular running noise	A Meshing/grinding noise: Bearing damage. B Knocking noise: Irregularity in the gearing	A Check the oil (see Sec. "Inspection and Maintenance"), change bearings B Contact customer service
Unusual, irregular running noise	Foreign bodies in the oil	<ul style="list-style-type: none"> • Check the oil (see Sec. "Inspection and Maintenance") • Stop the drive, contact customer service
Oil leaking ¹⁾ <ul style="list-style-type: none"> • From the gear cover plate • From the motor flange • From the motor oil seal • From the gear unit flange • From the output end oil seal 	A Rubber seal on the gear cover plate leaking B Seal defective C Gear unit not vented	A Tighten the bolts on the gear cover plate and observe the gear unit. Oil still leaking: Contact customer service B Contact customer service C Vent the gear unit (see Sec. "Mounting Positions")
Oil leaking from breather valve	A Too much oil B Drive operated in incorrect mounting position C Frequent cold starts (oil foams) and/or high oil level	A Correct the oil level (see Sec. "Inspection and Maintenance") B Mount the breather valve correctly (see Sec. "Mounting Positions") and correct the oil level (see "Lubricants")
Output shaft does not turn although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send in the gear unit/gearmotor for repair

1) Short-term oil/grease leakage at the oil seal is possible in the run-in phase (24 hours running time).

7.2 AM / AQA / AL adapter malfunctions

Problem	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Contact SEW-EURODRIVE customer service
Oil leaking	Seal defective	Contact SEW-EURODRIVE customer service
Output shaft does not turn although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send the gear unit to SEW-EURODRIVE for repair.
Change in running noise and / or vibrations occur	A Annular gear wear, short-term torque transfer through metal contact B Bolts to secure hub axially are loose.	A Change the annular gear B Tighten the bolts
Premature wear in annular gear	A Contact with aggressive fluids / oil; ozone influence; too high ambient temperatures etc, which can cause a change in the physical properties of the annular gear. B Impermissibly high ambient/contact temperature for the annular gear; maximum permitted temperature –20 °C to +80 °C. C Overload	Contact SEW-EURODRIVE customer service



7.3 AD input shaft assembly malfunctions

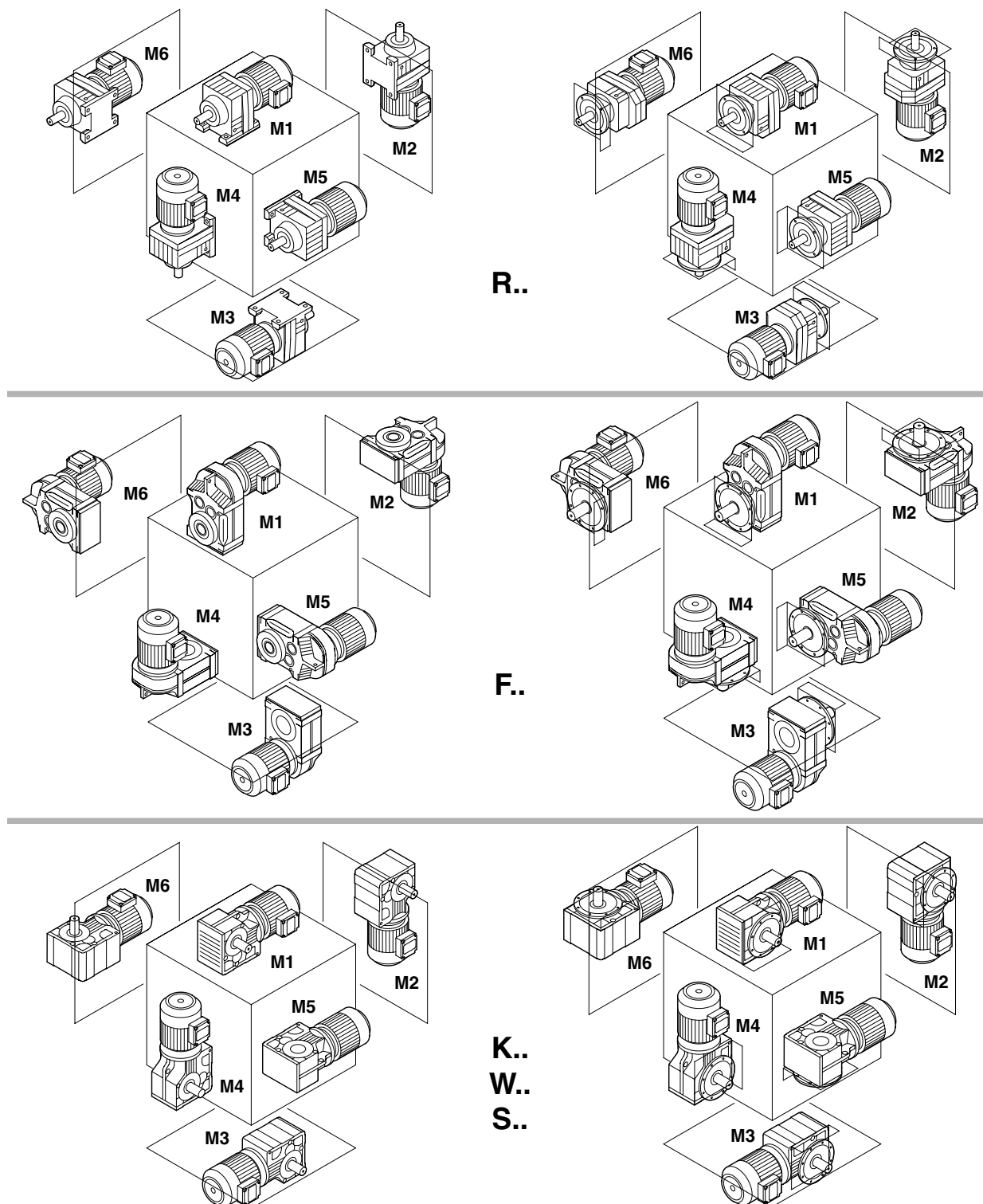
Problem	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage.	Contact SEW-EURODRIVE customer service
Oil leaking	Seal defective	Contact SEW-EURODRIVE customer service
Output shaft does not turn although the input shaft is rotated.	Connection between shaft and hub in gear unit or cover interrupted	Send the gear unit to SEW-EURODRIVE for repair.

8 Mounting Positions

8.1 General information on mounting positions

Mounting position designation

SEW differentiates between six mounting positions M1 ... M6 for gear units. The following figure shows the spatial orientation of the gearmotor in mounting positions M1 ... M6.



03203AXX

Figure 14: Depiction of mounting positions M1 ... M6

8.2 Key to the mounting position sheets


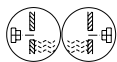



SPIROPLAN® gearmotors do not depend on any particular mounting position. However, mounting positions M1 to M6 are also shown for SPIROPLAN® gearmotors to assist you in working with this documentation.

Important: SPIROPLAN® gearmotors cannot be equipped with breather valves, oil level plugs or drain plugs.

Symbols used

The following table shows the symbols used in the mounting position sheets and what they mean:

Symbol	Meaning
	Breather valve
	Oil level plug
	Oil drain plug

Churning losses



Increased churning losses may arise in some mounting positions. Contact SEW-EURODRIVE in case of the following combinations:

Mounting position	Gear unit type	Gear unit size	Input speed [1/min]
M2, M4	R	97 ... 107	> 2500
		> 107	> 1500
M2, M3, M4, M5, M6	F	97 ... 107	> 2500
		> 107	> 1500
	K	77 ... 107	> 2500
		> 107	> 1500
	S	77 ... 97	> 2500
		> 97	> 1500

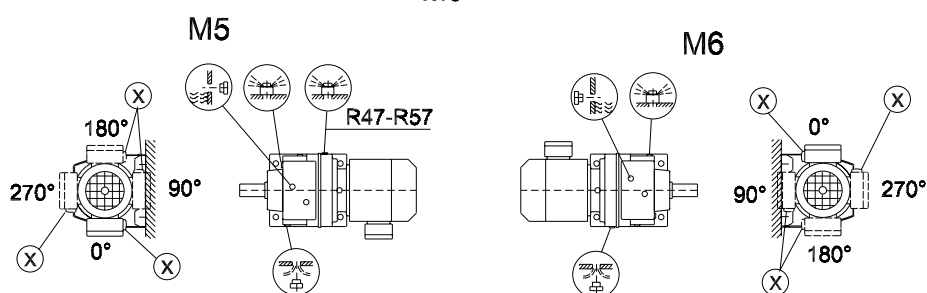
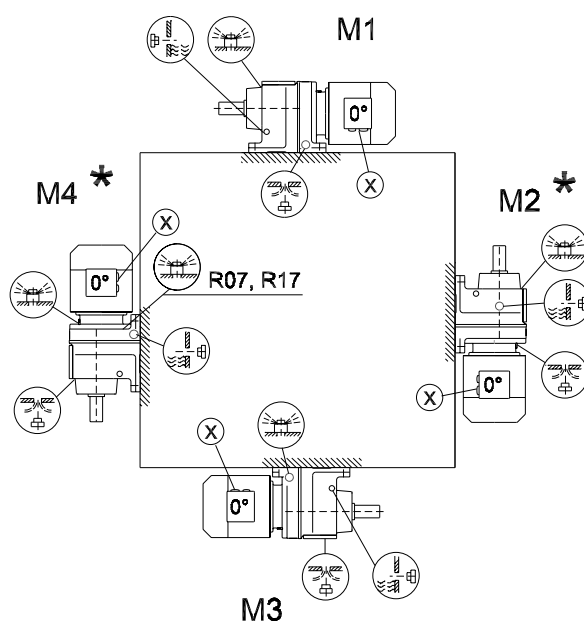
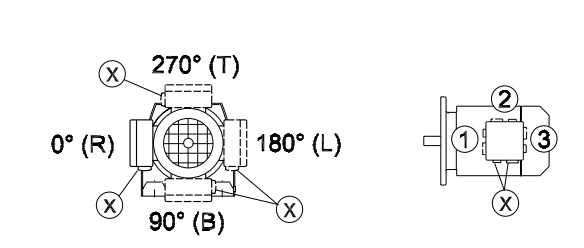
Mounting Positions

Mounting positions for R helical gearmotors

8.3 Mounting positions for R helical gearmotors

R07-R167

04 040 200

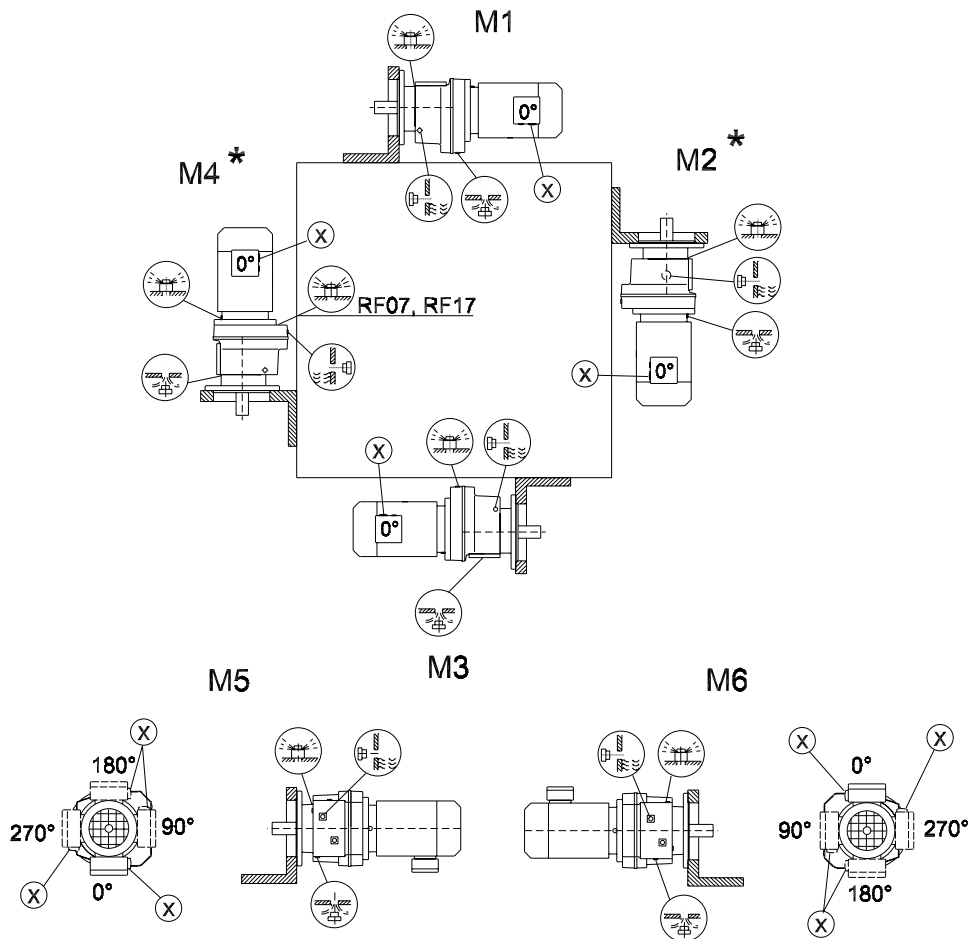
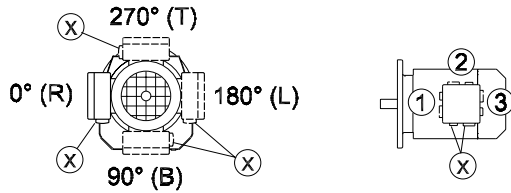


R07		M1, M2, M3, M5, M6
R17, R27		M1, M3, M5, M6
R07, R17, R27		
R47, R57		M5

* → page 51

RF07-RF167

04 041 200



RF07		M1, M2, M3, M5, M6
RF17, RF27		M1, M3, M5, M6
RF07, RF17, RF27		
RF47, RF57		M5

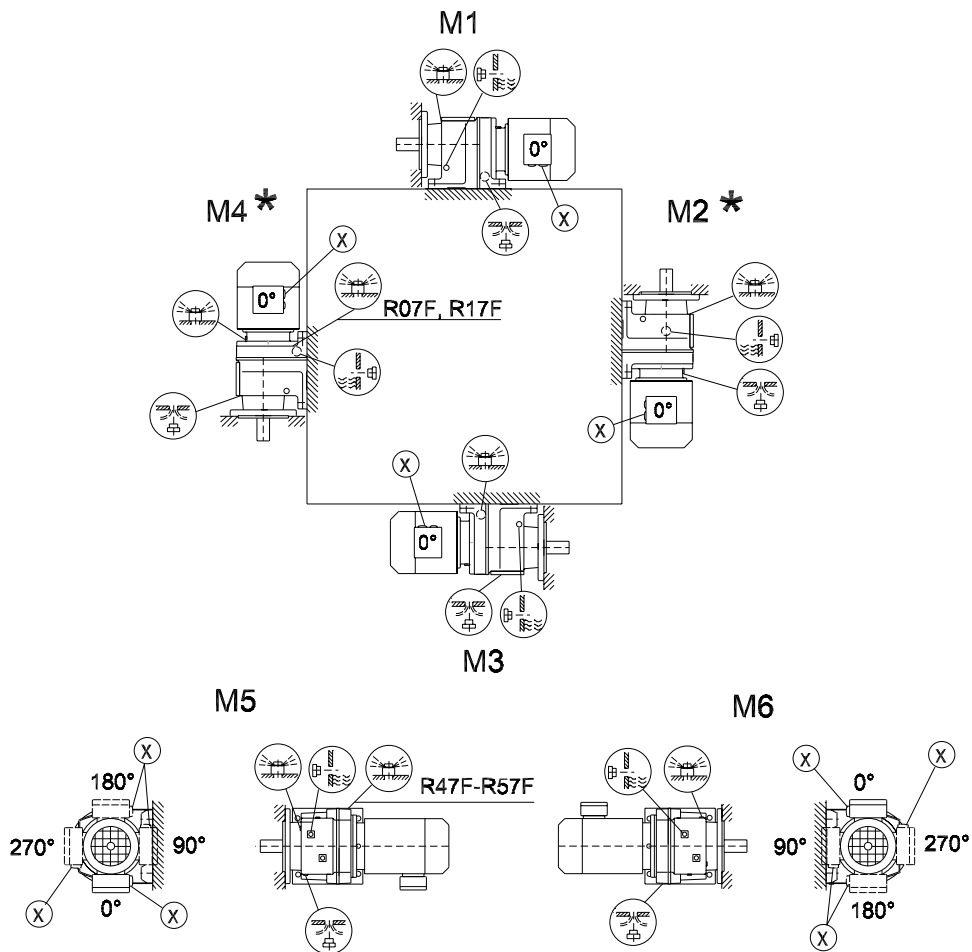
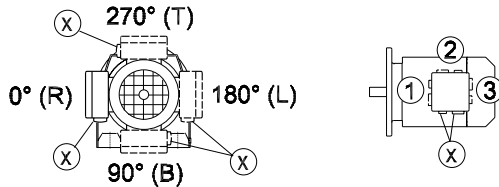
* → page 51

Mounting Positions

Mounting positions for R helical gearmotors

R07F-R87F

04 042 200



R07F		M1, M2, M3, M5, M6
R17F, R27F		M1, M3, M5, M6
R07F, R17F, R27F		
R47F, R57F		M5

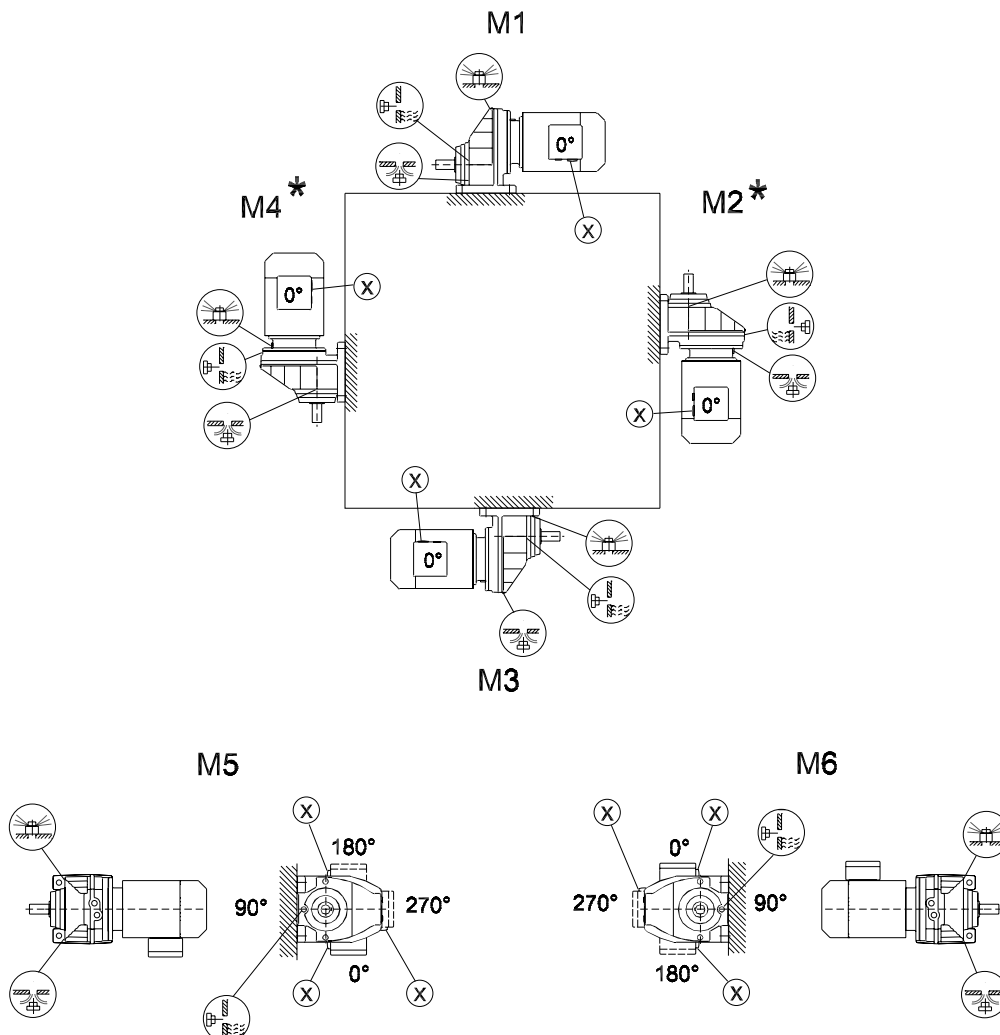
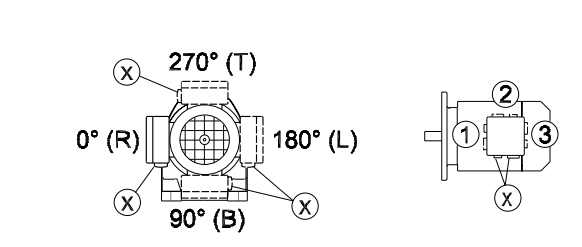
* → page 51

Important: See the information in the "Gearmotors" catalog, section "Project Planning for Gear Units/Overhung and axial loads."

8.4 Mounting positions of RX helical gearmotors

RX57-RX107

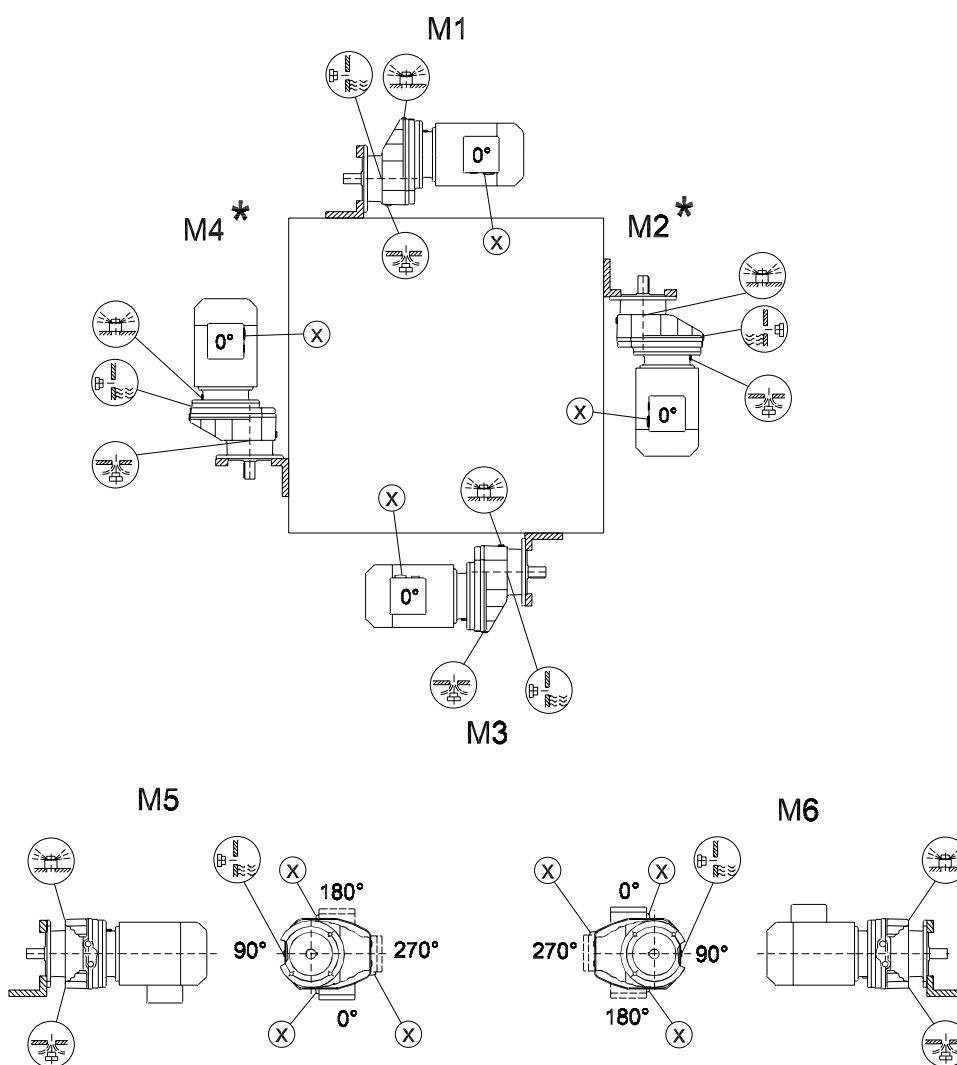
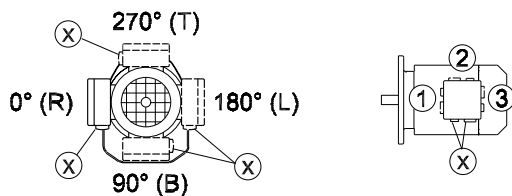
04 043 200



* → page 51

Mounting Positions

Mounting positions of RX helical gearmotors

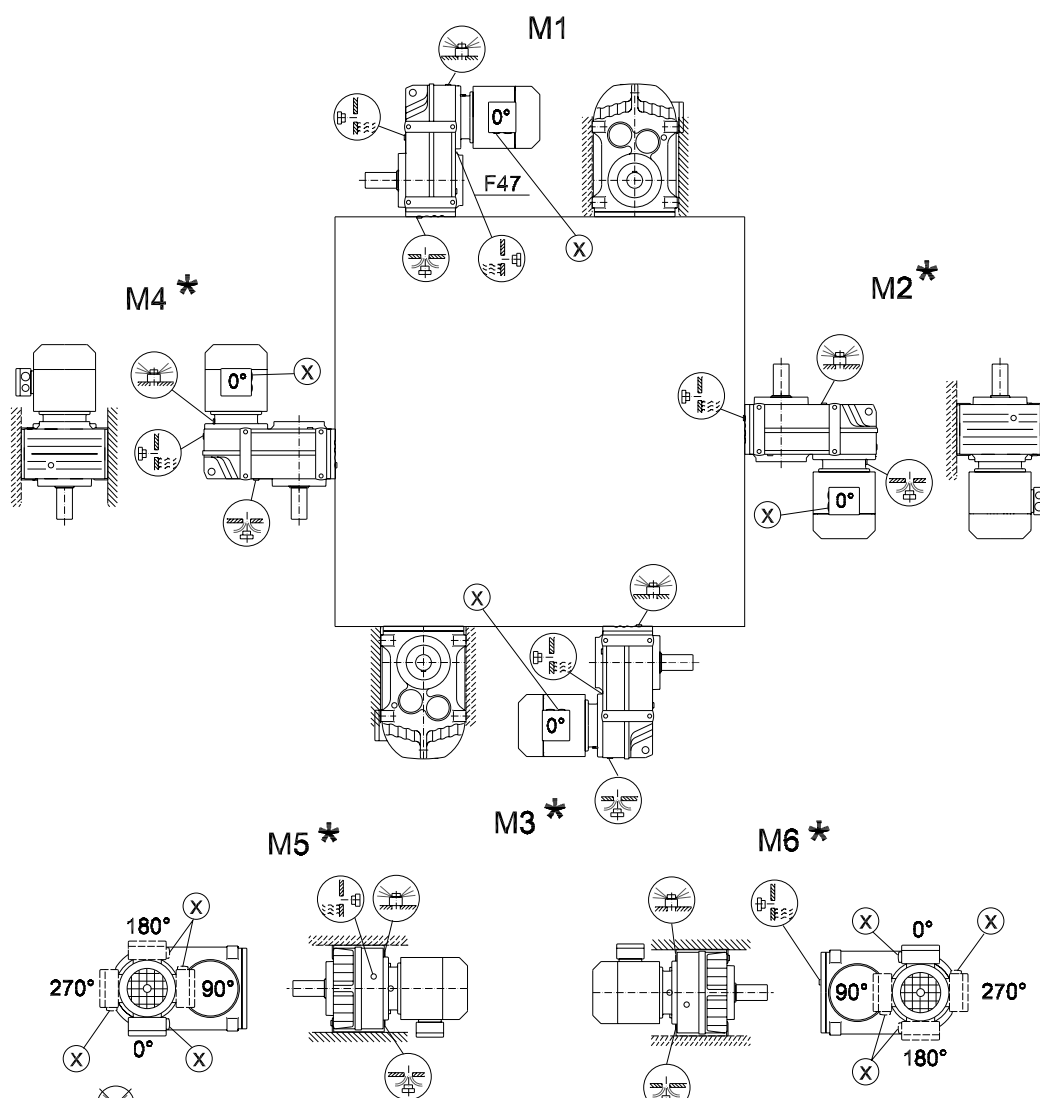
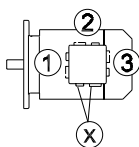
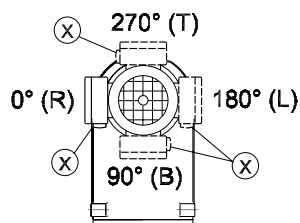
RXF57 - RXF107**04 044 200**


* → page 51

8.5 Mounting positions for parallel shaft helical gearmotors


F/FA..B/FH27B-157B, FV27B-107B

42 042 200



F..27  M1, M3, M5, M6

F..27  M1 - M6

F..27  M1, M3, M5, M6

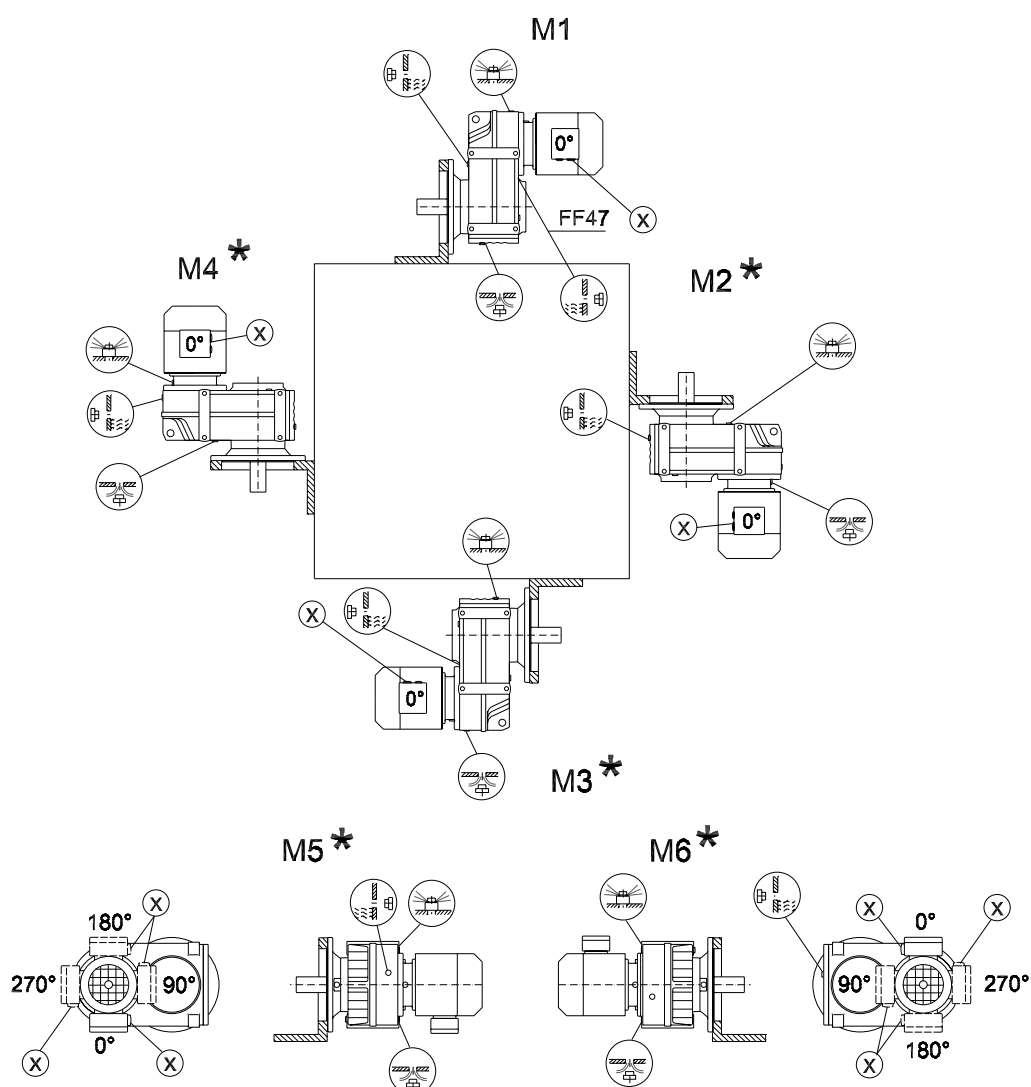
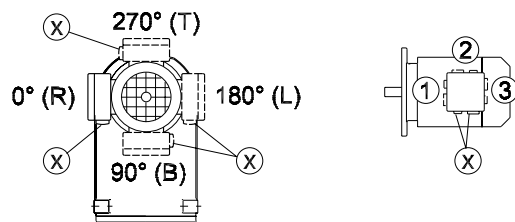
* → page 51

Mounting Positions

Mounting positions for parallel shaft helical gearmotors

FF/FAF/FHF/FAZ/FHZ27-157, FVF/FVZ27-107

42 043 200

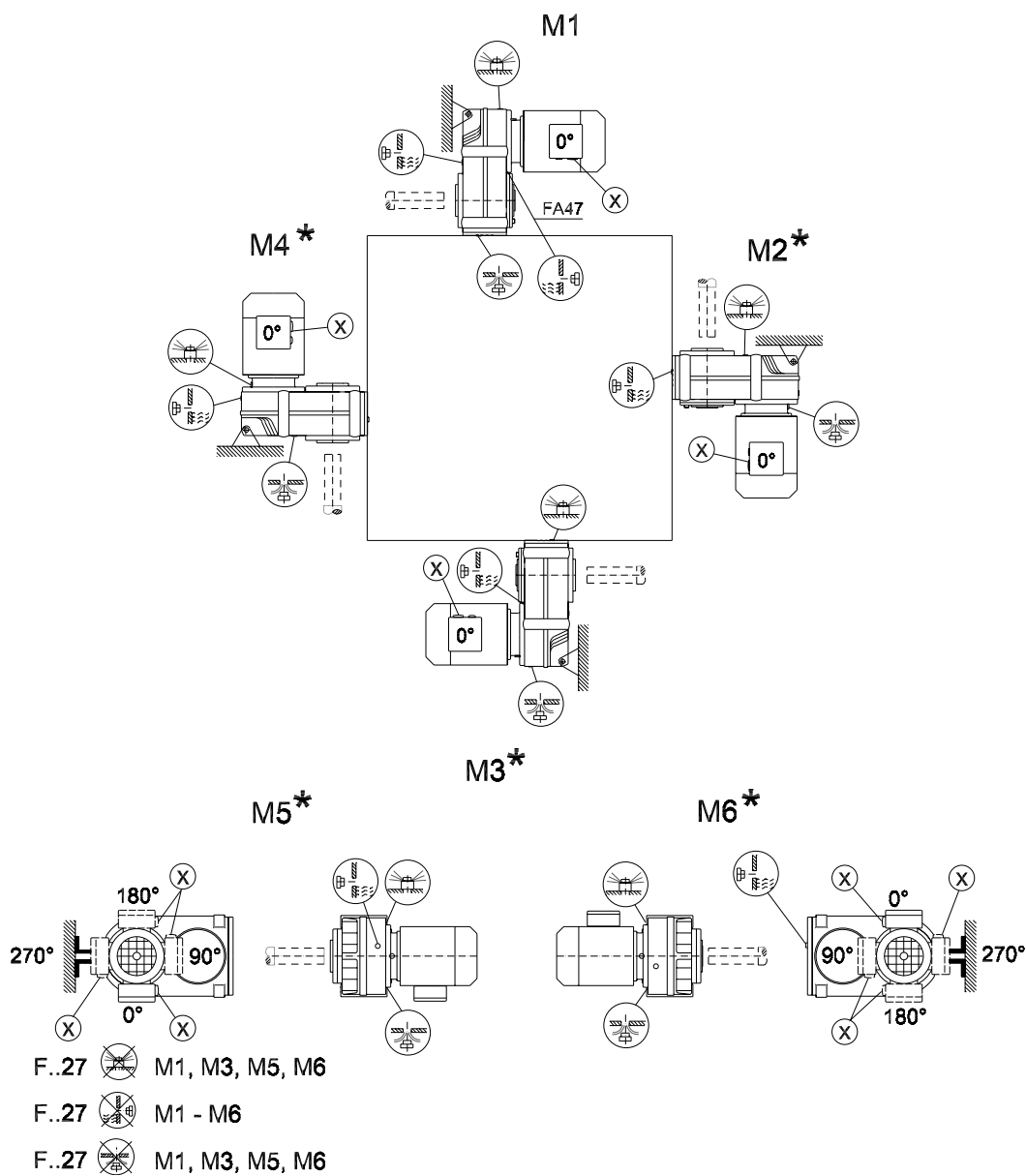
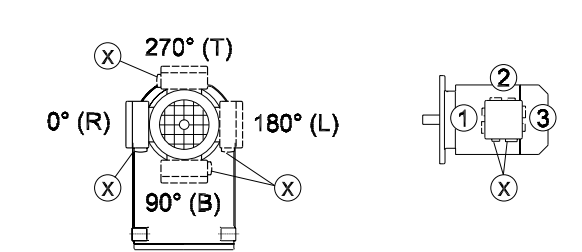


- F..27 M1, M3, M5, M6
 F..27 M1 - M6
 F..27 M1, M3, M5, M6

* → page 51

FA/FH27-157, FV27-107, FT37-97

42 044 200

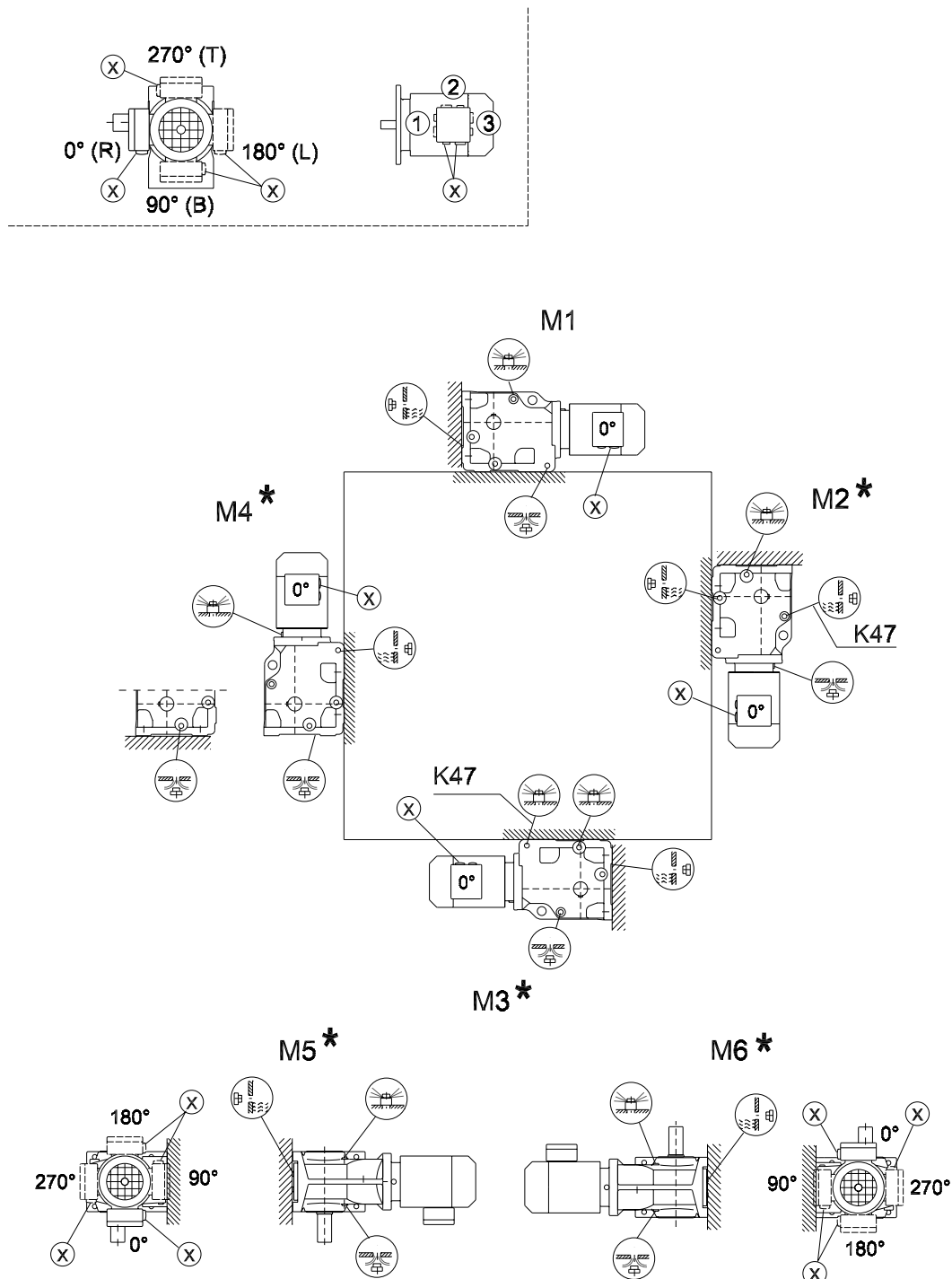


* → page 51


8.6 Mounting positions for helical-bevel gearmotors

K/KA..B/KH37B-157B, KV37B-107B

34 025 200

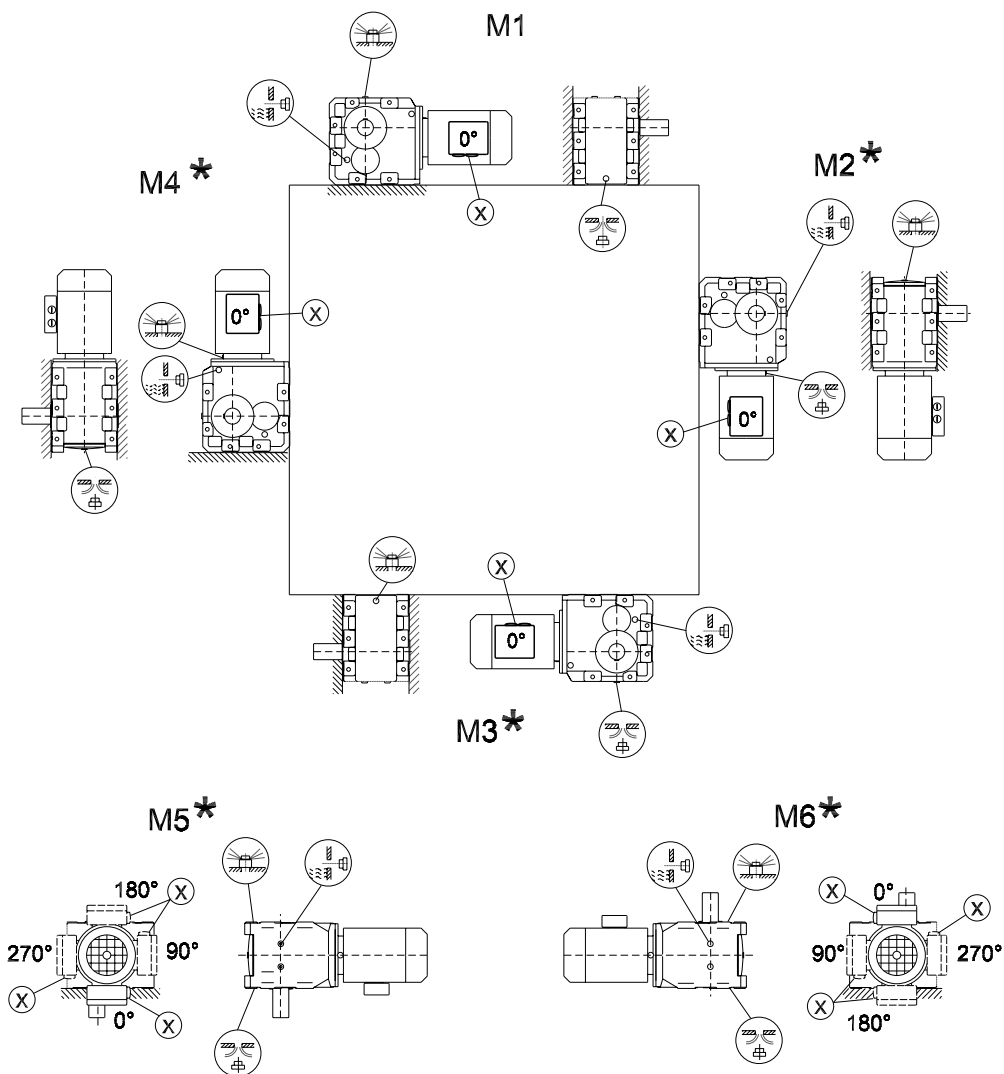
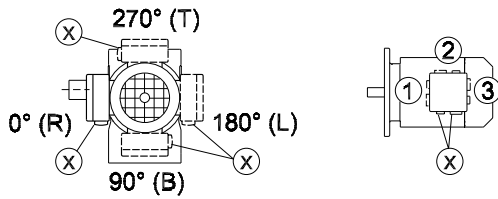


* → page 51

Important: See the  information in the "Gearmotors" catalog, section "Project Planning for Gear Units/Overhung and axial loads."

K167-187, KH167B-187B

34 026 200



* → page 51

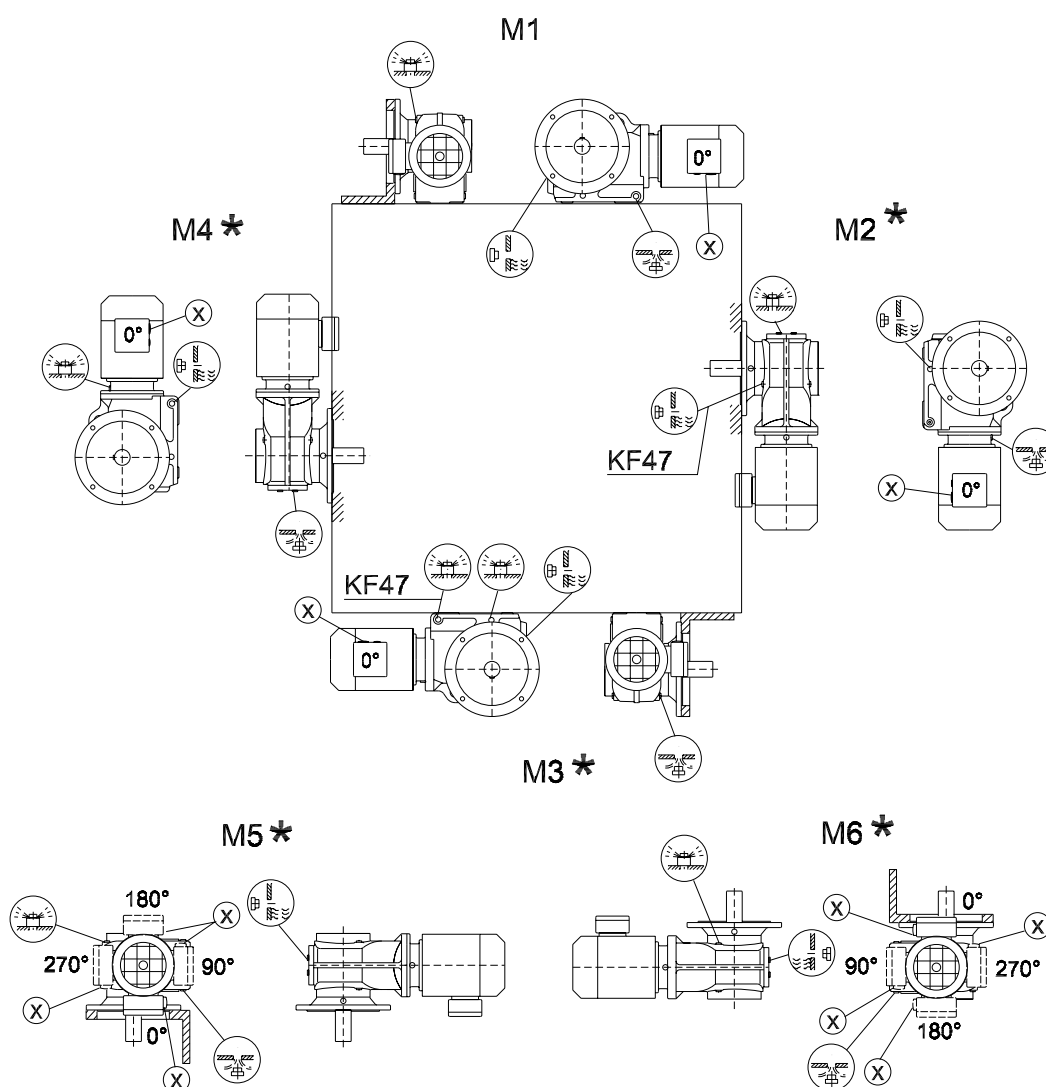
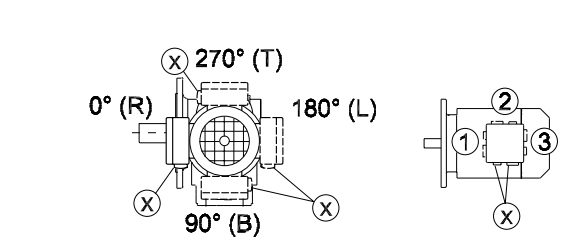
Important: See the **i** information in the "Gearmotors" catalog, section "Project Planning for Gear Units/Overhung and axial loads."

Mounting Positions

Mounting positions for helical-bevel gearmotors

KF/KAF/KHF/KAZ/KHZ37-157, KVF/KVZ37-107

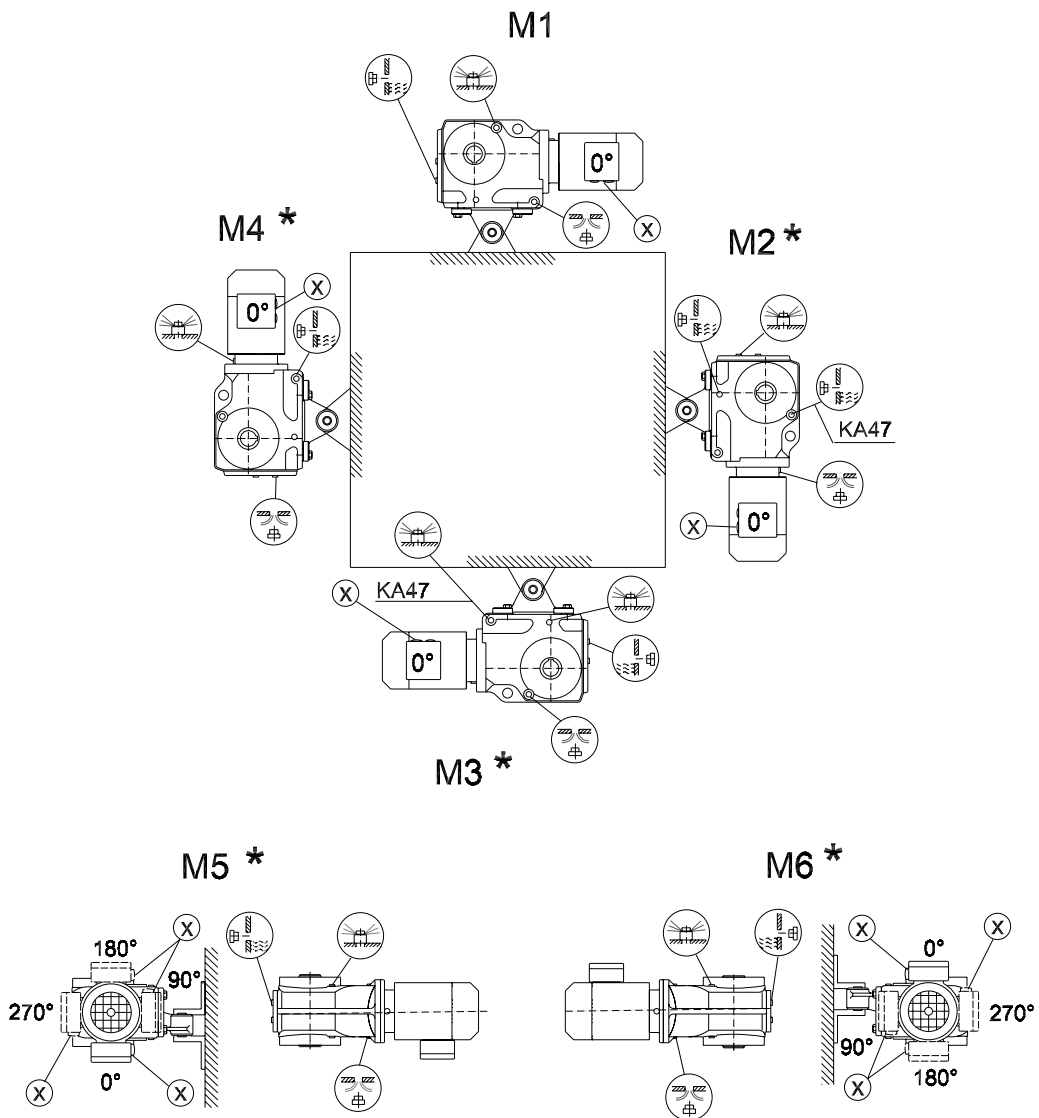
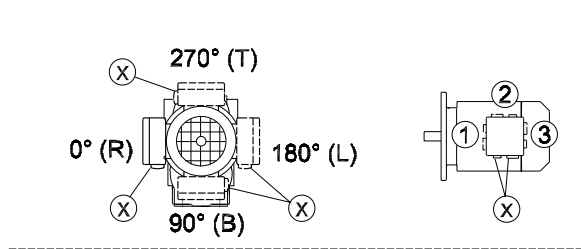
34 027 200



* → page 51

KA/KH37-157, KV37-107, KT37-97

39 025 200



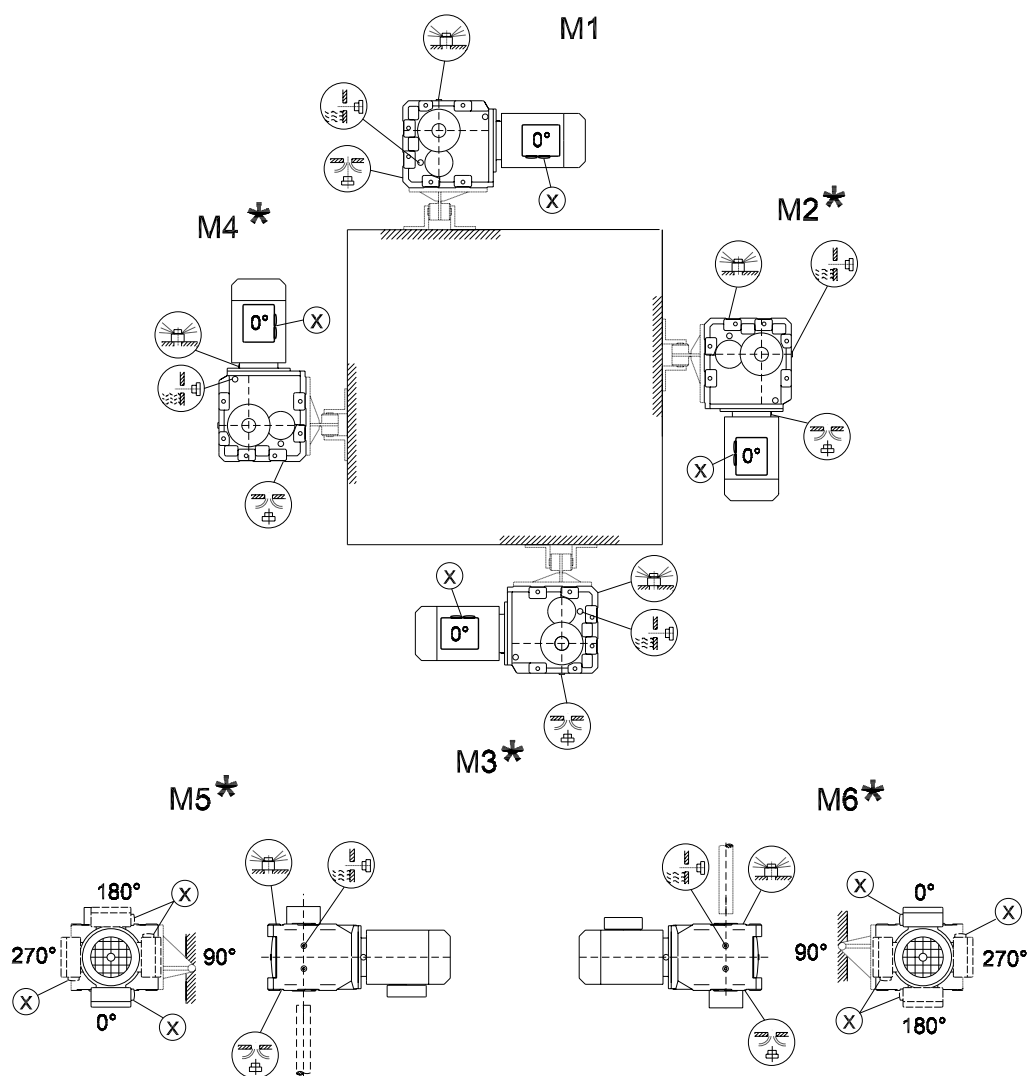
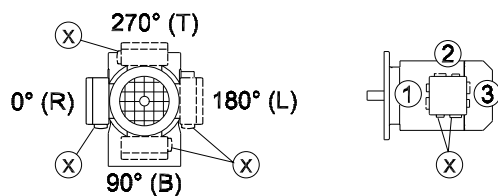
* → page 51

Mounting Positions

Mounting positions for helical-bevel gearmotors

KH167-187

39 026 200

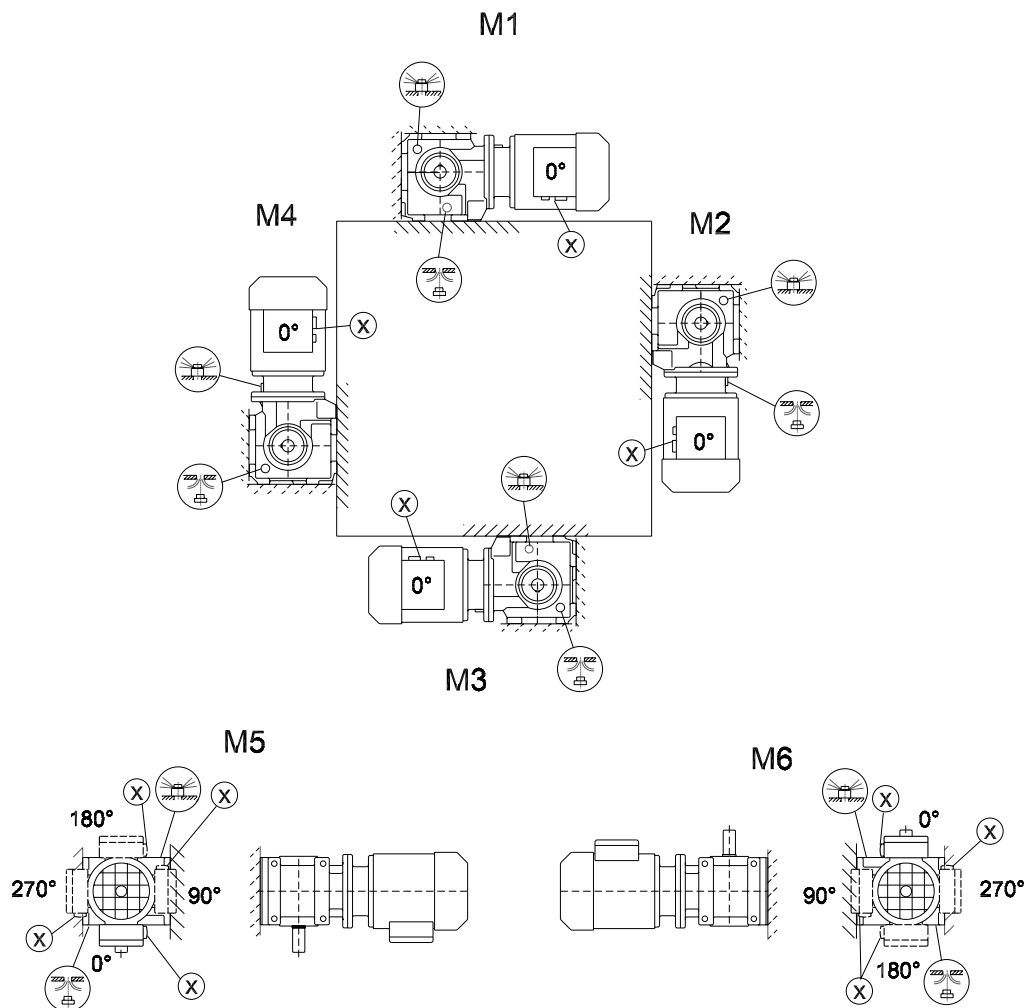
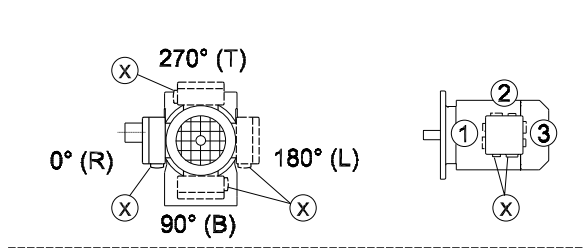



* → page 51

8.7 Mounting positions for helical-worm gearmotors

S37

05 025 200



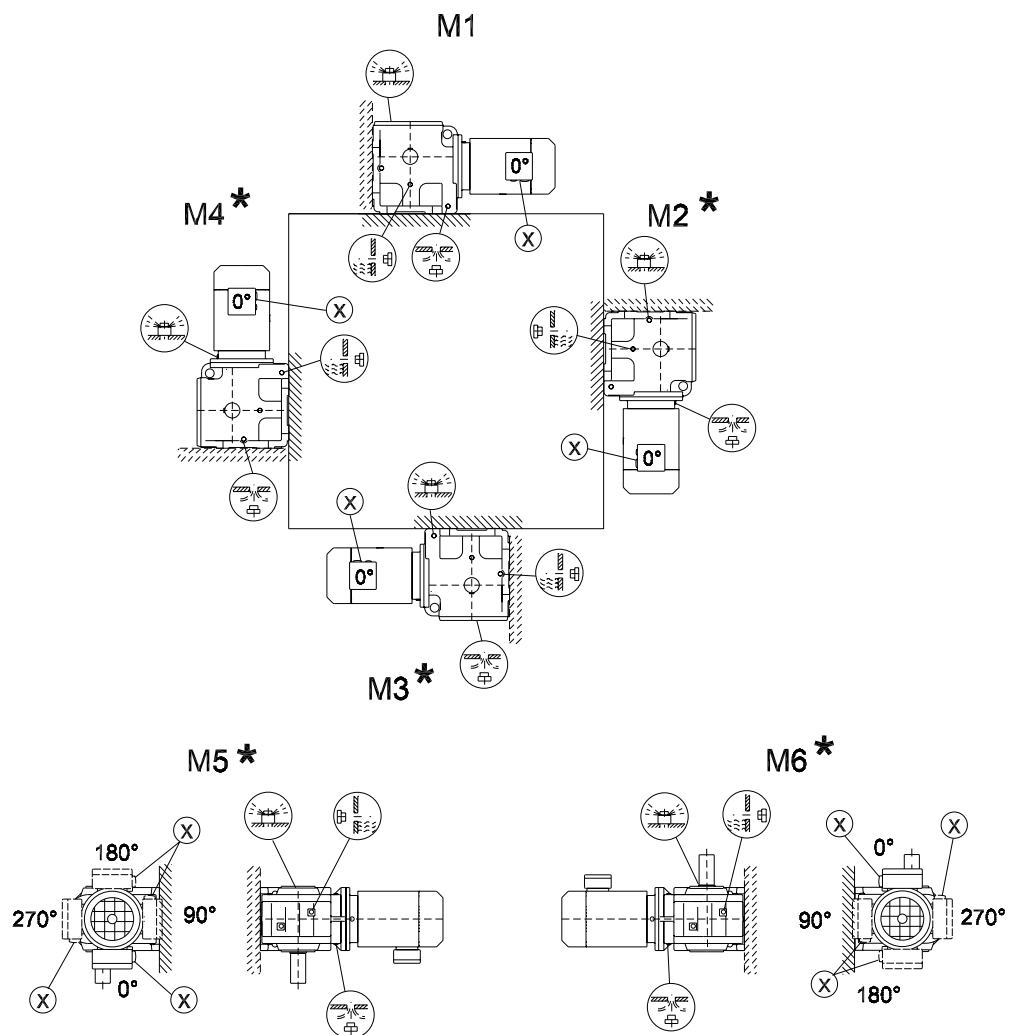
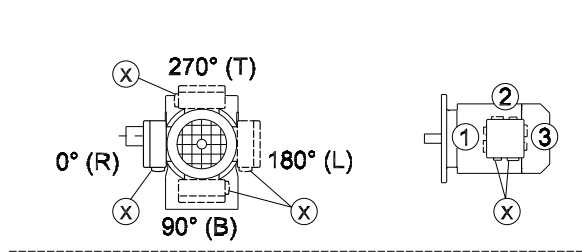
Important: See the  information in the "Gearmotors" catalog, section "Project Planning for Gear Units/Overhung and axial loads."

Mounting Positions


Mounting positions for helical-worm gearmotors

S47 - S97

05 026 200

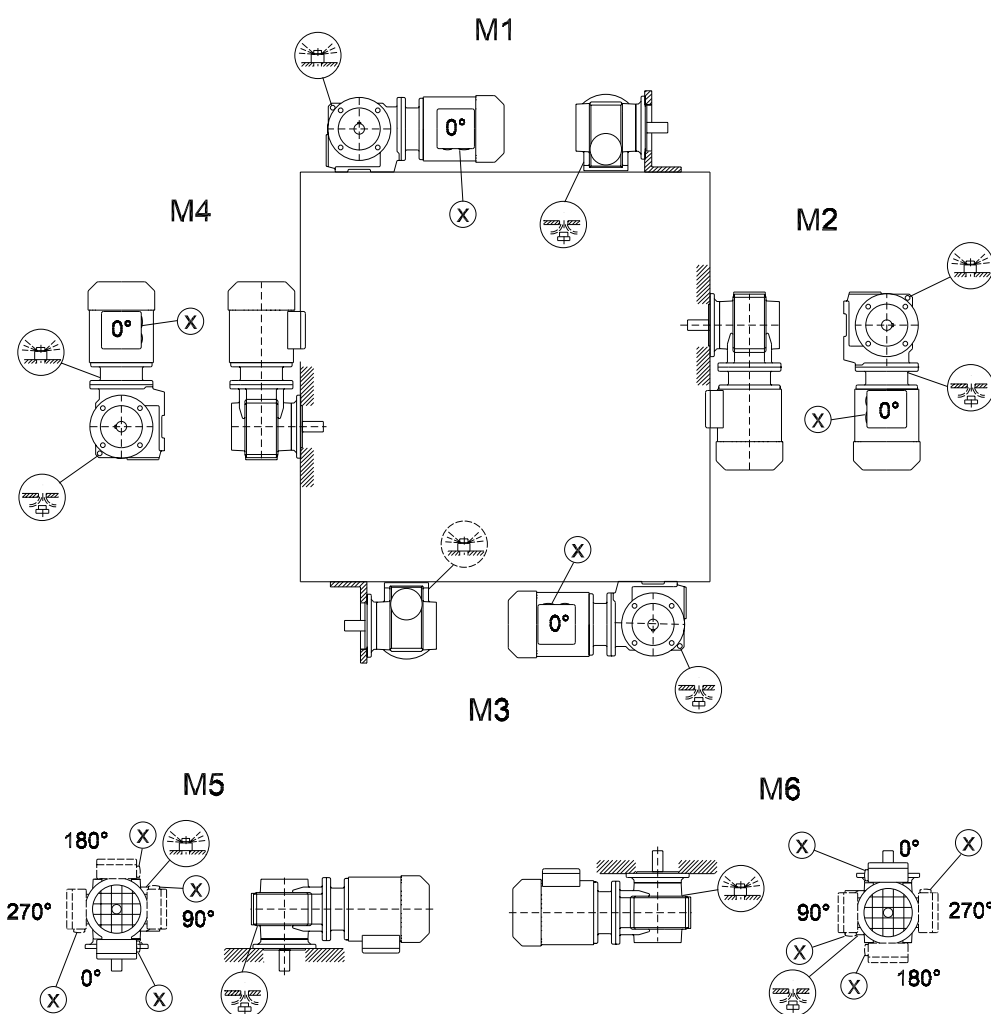
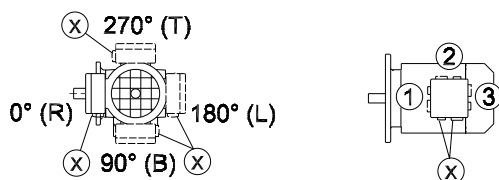


* → page 51

Important: See the  information in the "Gearmotors" catalog, section "Project Planning for Gear Units/Overhung and axial loads."

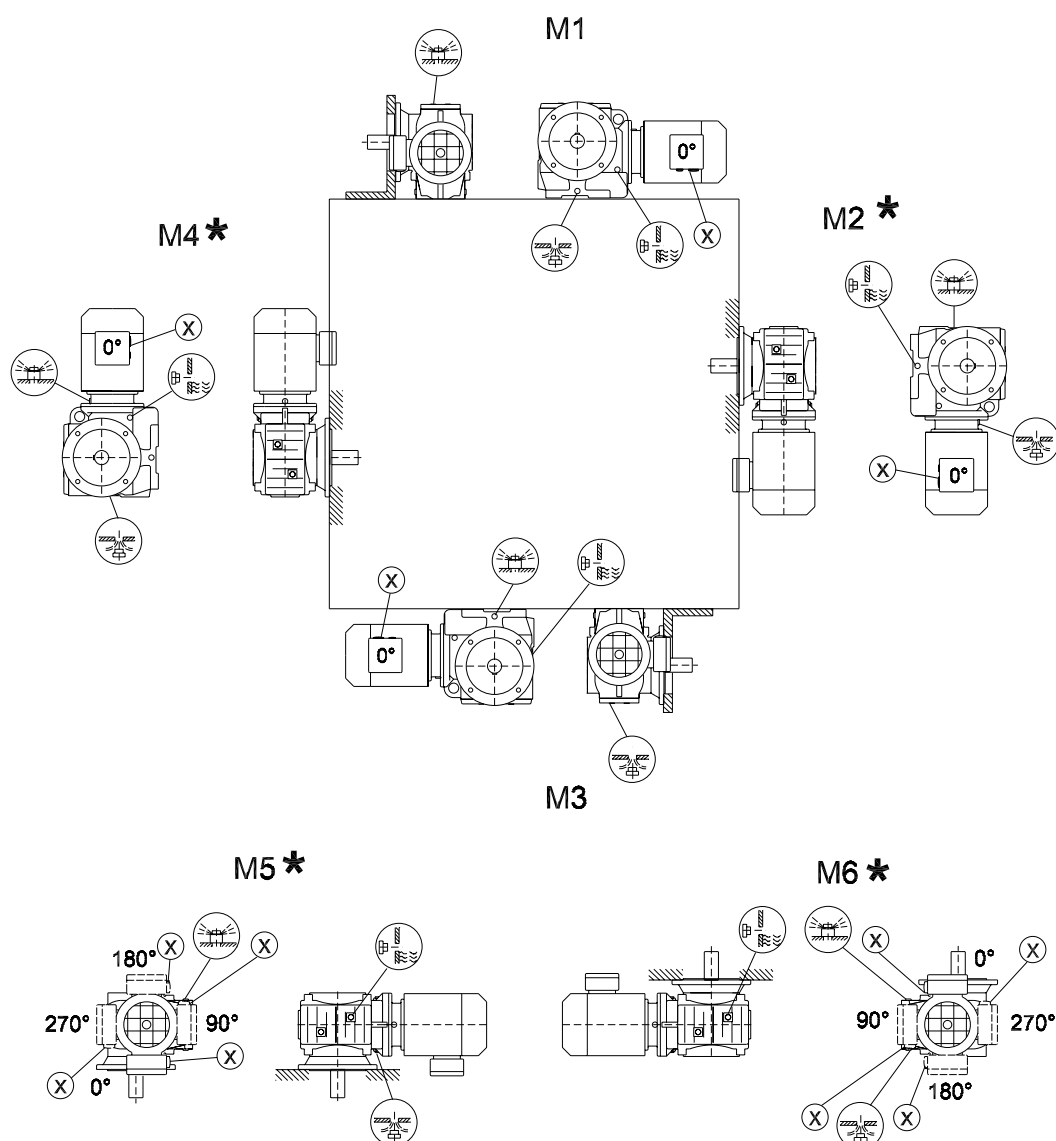
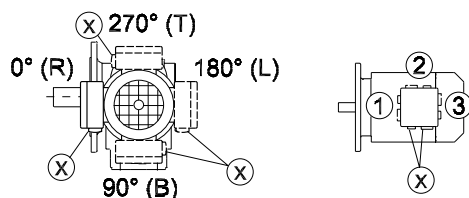
SF/SAF/SHF37

05 027 200



Mounting Positions

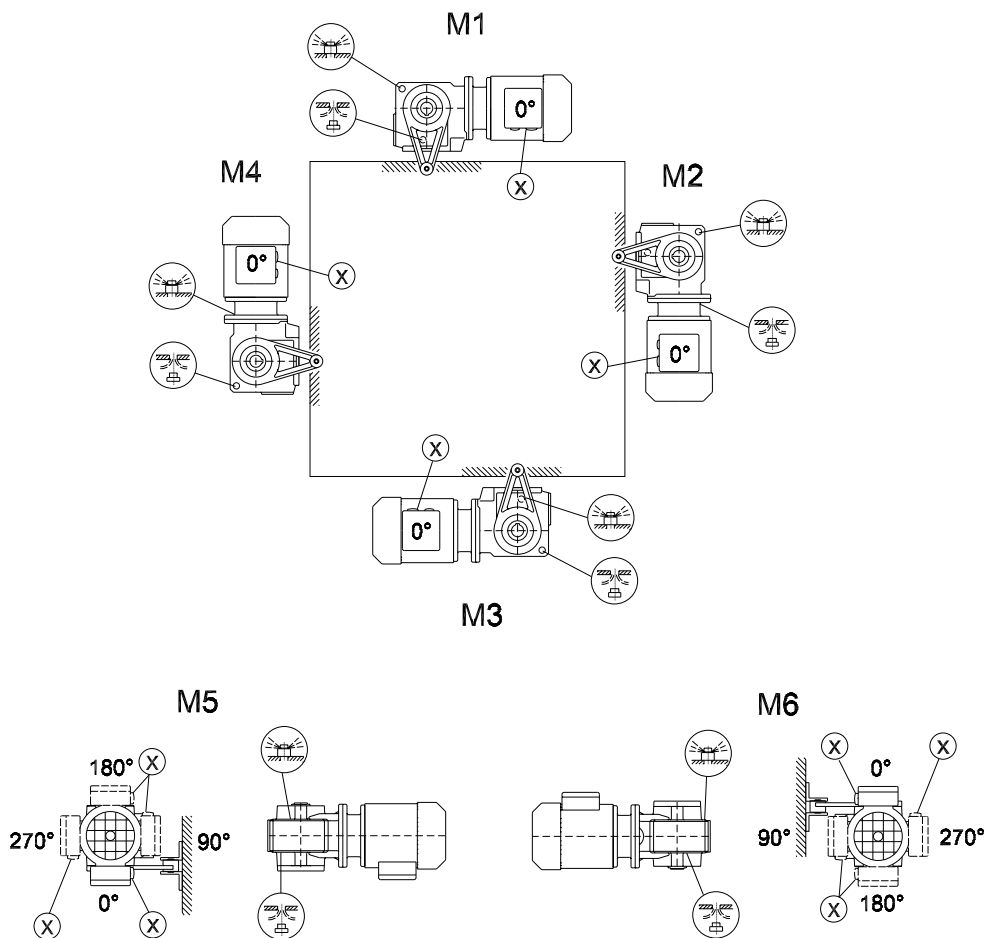
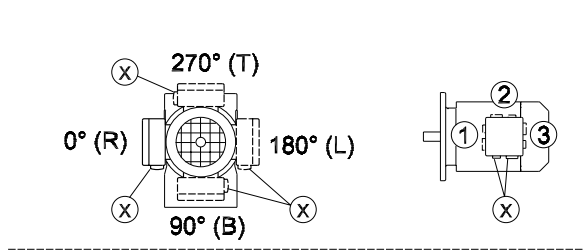
Mounting positions for helical-worm gearmotors

SF/SAF/SHF/SAZ/SHZ47-97**05 028 200**

* → page 51

SA/SH/ST37

28 020 200

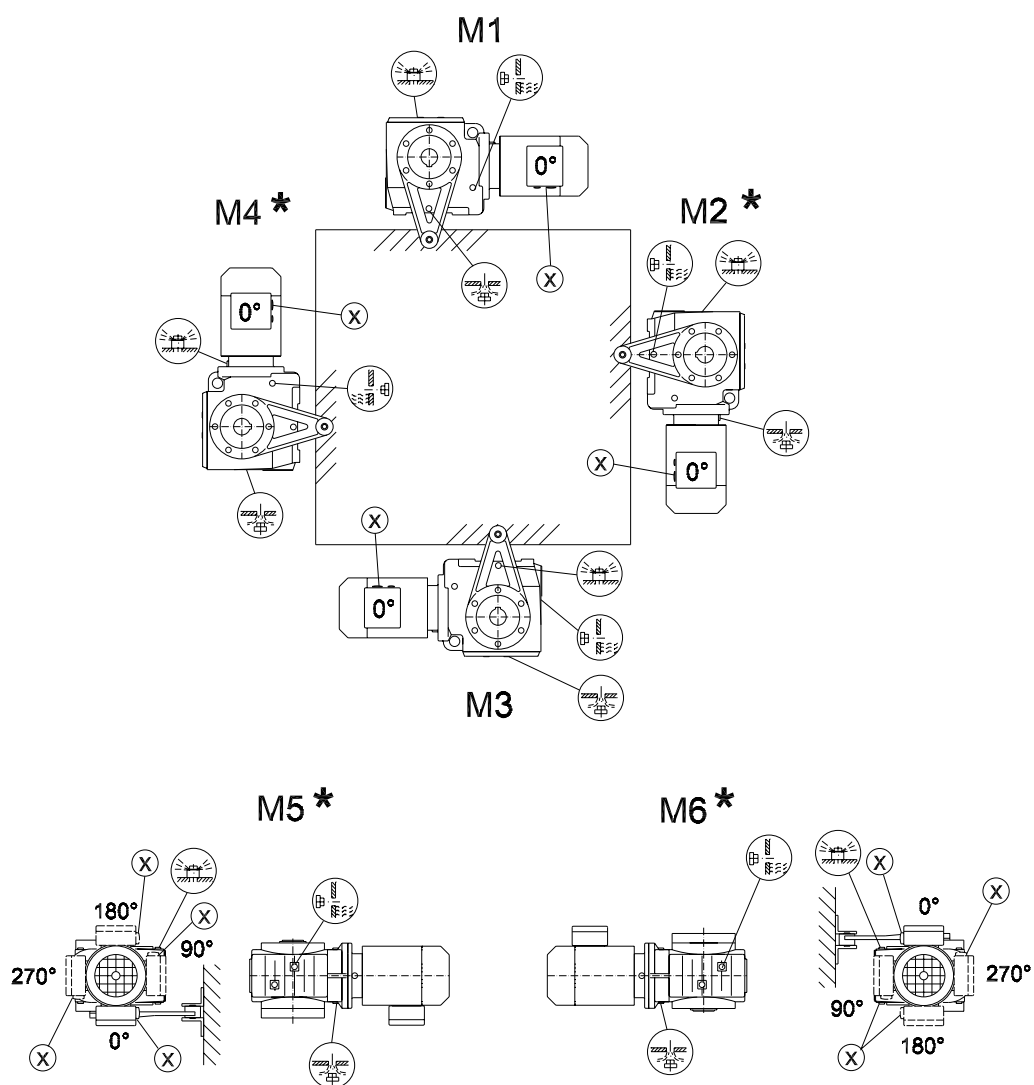
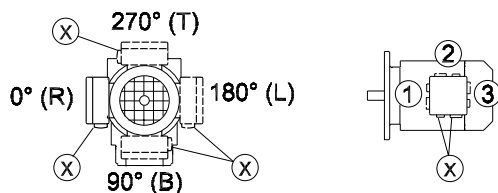


Mounting Positions

Mounting positions for helical-worm gearmotors

SA/SH/ST47-97

28 021 200

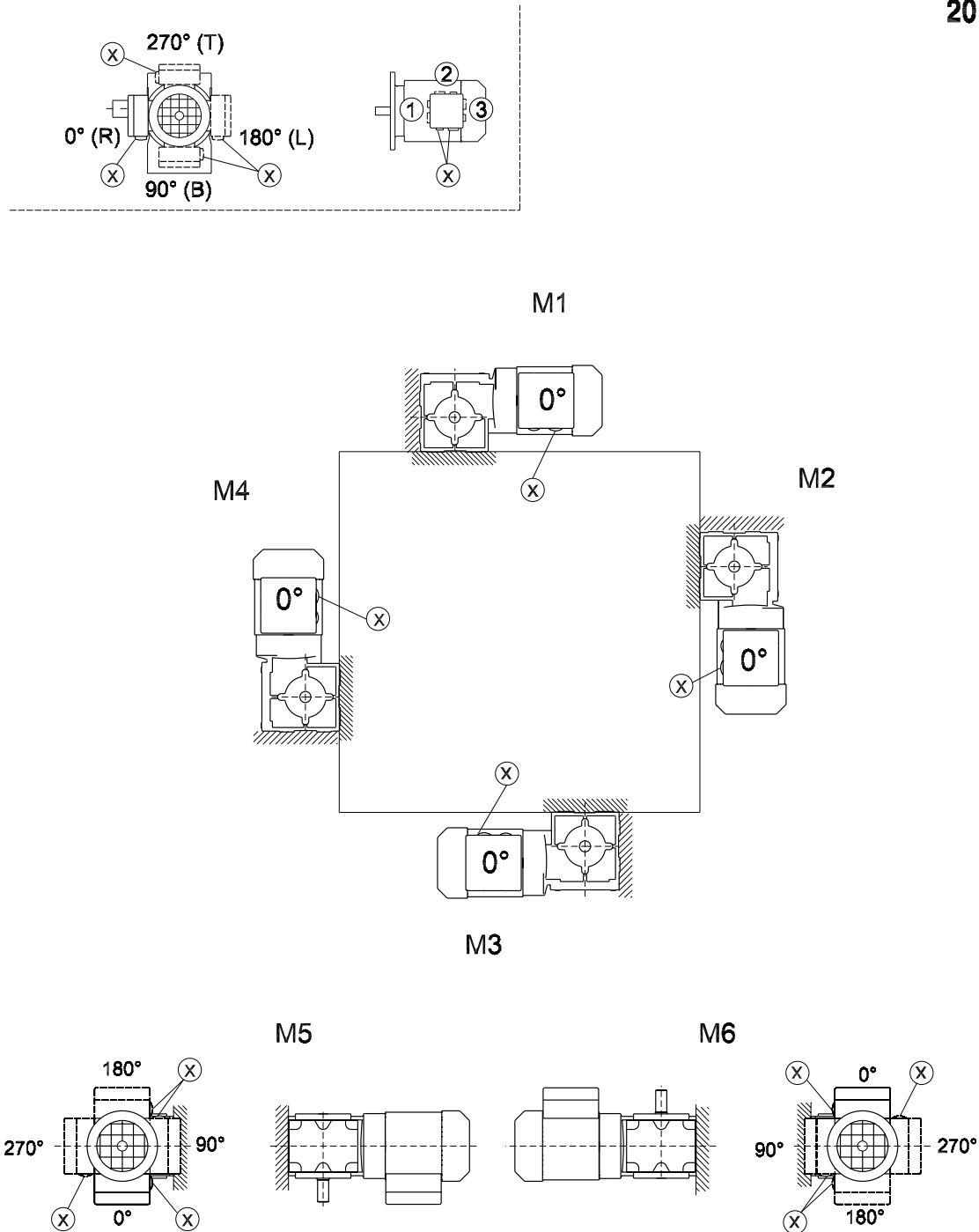


* → page 51

8.8 Mounting positions for SPIROPLAN® W gearmotors

W10-30

20 001 002

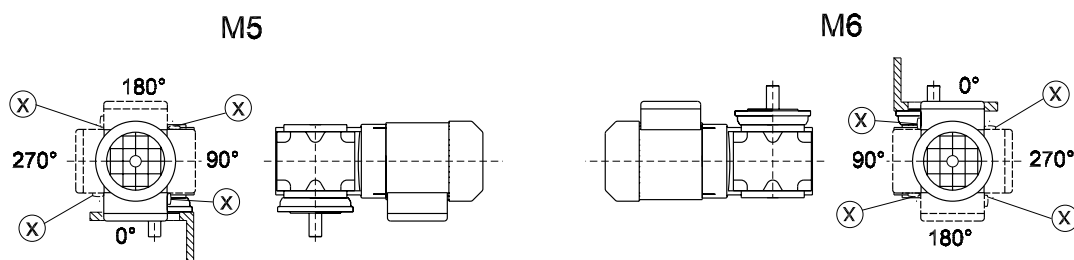
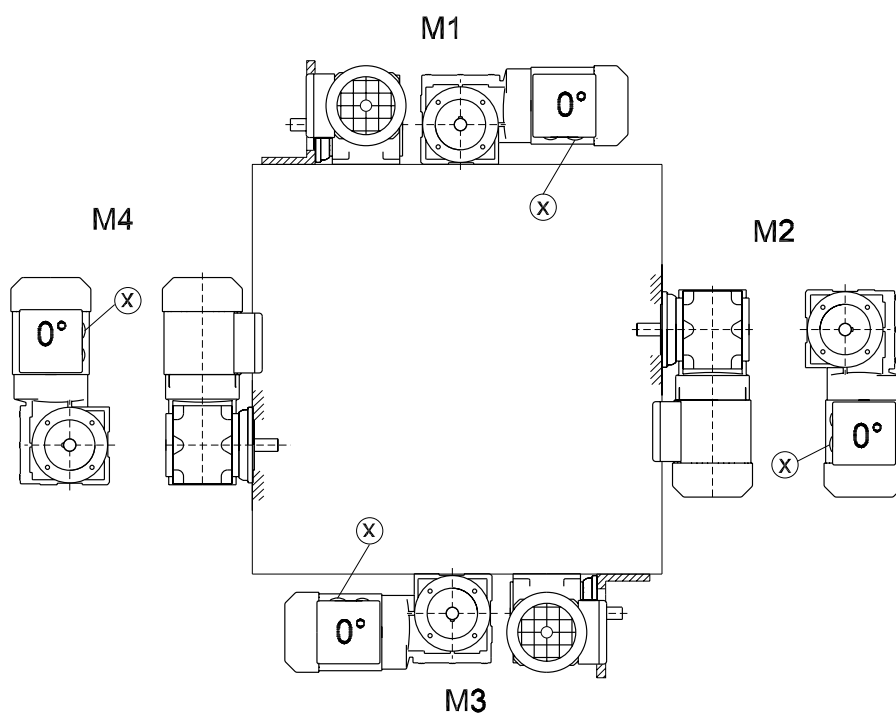
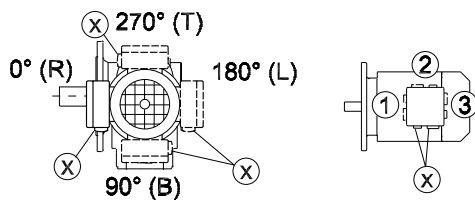


Mounting Positions

Mounting positions for SPIROPLAN® W gearmotors

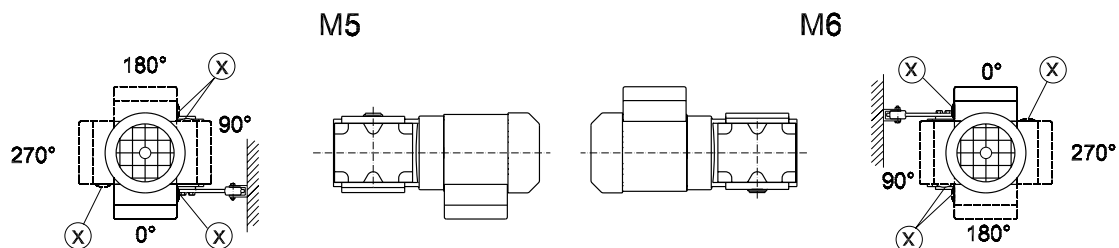
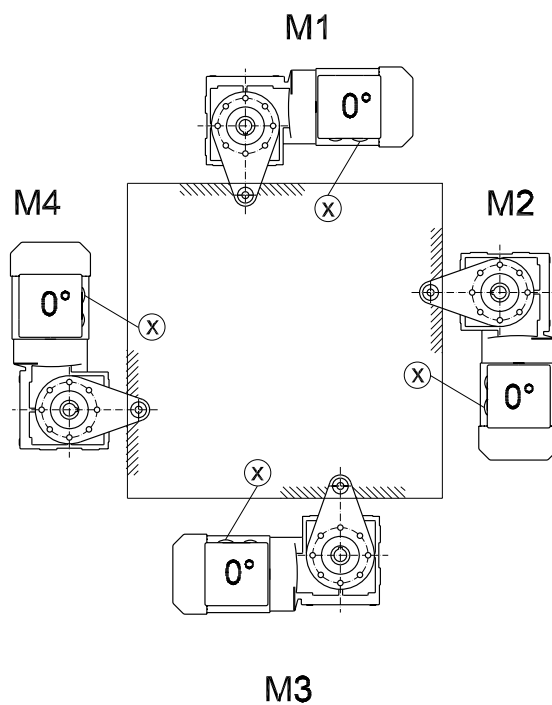
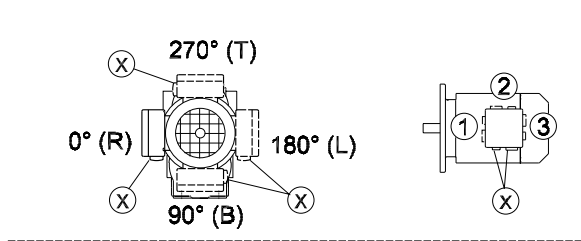
WF/WAF10-30

20 002 002



WA10-30

20 003 002





9 Lubricants

General information

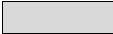



Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The decisive factor is the mounting position (M1 ... M6, → Sec. "Mounting Positions and Important Order Information") specified when ordering the drive. You must adapt the lubricant fill to any subsequent changes made to the mounting position (→ Lubricant fill quantities).

9.1 Lubricant table

The lubricant table on the following page shows the permitted lubricants for SEW-EURODRIVE gear units. Please note the following key to the lubricant table.

Key to the lubricant table



Abbreviations used, meaning of shading and notes:

CLP	= Mineral oil
CLP PG	= Polyglycol (W gear units, conforms to USDA-H1)
CLP HC	= Synthetic hydrocarbons
E	= Ester oil (water pollution danger category WGK 1)
HCE	= Synthetic hydrocarbons + ester oil (USDA-H1 certification)
HLP	= Hydraulic oil
	= Synthetic lubricant (= synthetic anti-friction bearing grease)
	= Mineral lubricant (= mineral-based anti-friction bearing grease)
1)	Helical-worm gear units with PG oil: Please contact SEW
2)	Special lubricant for Spiroplan® gear units only
3)	Recommendation: Select SEW $f_B \geq 1.2$
4)	Pay attention to critical starting behavior at low temperatures!
5)	Low-viscosity grease
6)	Ambient temperature
	Lubricant for the food industry (food grade oil)
	Biodegradable oil (lubricant for use in agriculture, forestry and water resources)



**Anti-friction
bearing greases**

The anti-friction bearings in gear units and motors are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends regreasing anti-friction bearings with a grease fill at the same time as changing the oil.

	Ambient temperature	Manufacturer	Type
Anti-friction bearing in gear unit	-20 °C ... +60 °C	Mobil	Mobilux EP 2
	-40 °C ... +80 °C	Mobil	Mobiltemp SHC 100
Anti-friction bearing in motor	-20 °C ... +80 °C	Esso	Unirex EQ3
	-20 °C ... +60 °C	Shell	Alvania RL3
	+80 °C ... +100 °C	Klüber	Barrierta L55/2
	-45 °C ... -25 °C	Shell	Aero Shell Grease 16
Special greases for anti-friction bearings in gear units:			
	-30 °C ... +40 °C	Aral	Eural Grease EP 2
	-20 °C ... +40 °C	Aral	Aralube BAB EP2



The following grease quantities are required:

- For fast-running bearings (motor and gear unit input end): Fill the cavities between the rolling elements one third full with grease.
- For slow-running bearings (in gear units and at gear unit output end): Fill the cavities between the rolling elements two thirds full with grease.



Lubricants

Lubricant table

Lubricant table

01 805 892

	6)	DIN (ISO)	ISO, NLGI	Mobil®	Shell	ALCOBLENDE AUTOSYNTH	ARAL	BP Energol	Tribol	TEMACO	Optigear	FUCHS
R...	Standard -10 +40	CLP (CC)	VG 220	Mobilgear 630	Shell Omala 220	Klüberoil GEM 1-220	Aral Degol BG 220	BP Energol GR-XP 220	Tribol 1100/220	Meropa 220	Optigear BM 220	Renolin CLP 220
K...(HK...)	-25 +80	CLP PG	VG 220	Mobil Glygoyle 30	Shell Tivela S 220	Klüberoil GH 6-220	Aral Degol GS 220	BP Energol SG-XP 220	Tribol 800/220	Synlube CLP 220	Optiflex A 220	
F...	4) -40 +80	CLP HC	VG 220	Mobil SHC 630	Shell Omala HD 220	Klüberoil EG 4-220	Aral Degol PAS 220		Tribol 1510/220	Pinnacle EP 220	Optigear Synthetic A 220	Renolin Unisyn CLP 220
	4) -40 +40		VG 150	Mobil SHC 629	Shell Omala HD 150	Klüberoil EG 4-150				Pinnacle EP 150		
	-20 +25	CLP (CC)	VG 150	Mobilgear 627	Shell Omala 100	Klüberoil GEM 1-150	Aral Degol BG 100	BP Energol GR-XP 100	Tribol 1100/100	Meropa 150	Optigear BM 100	Renolin CLP 150
	-30 +10	HLP (HM)	VG 68-46	Mobil D.T.E. 13M	Shell Tellus T 32	Klüberoil GEM 1-68	Aral Degol BG 46		Tribol 1100/68	Rando EP Ashless 46	Optigear 32	Renolin B 46 HVI
	4) -40 +10	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32				Cetus PAO 46		
	4) -40 -20	HLP (HM)	VG 22	Mobil D.T.E. 11M	Shell Tellus T 15	Isoflex MT 30 ROT		BP Energol HLP-HM 15		Rando HDZ 15		
	Standard 0 +40	CLP (CC)	VG 680	Mobilgear 636	Shell Omala 680	Klüberoil GEM 1-680	Aral Degol BG 680	BP Energol GR-XP 680	Tribol 1100/680	Meropa 680	Optigear BM 680	Renolin CLP 680
S...(HS...)	-20 +60	CLP PG	VG 680 ¹⁾		Shell Tivela S 680	Klüberoil GH 6-680		BP Energol SG-XP 680	Tribol 800/680	Synlube CLP 680		
	4) -30 +80	CLP HC	VG 460	Mobil SHC 634	Shell Omala HD 460	Klüberoil EG 4-460				Pinnacle EP 460		
	4) -40 +10		VG 150	Mobil SHC 629	Shell Omala HD 150	Klüberoil EG 4-150				Pinnacle EP 150		
	-20 +10	CLP (CC)	VG 150	Mobilgear 627	Shell Omala 100	Klüberoil GEM 1-150	Aral Degol BG 100	BP Energol GR-XP 100	Tribol 1100/100	Meropa 100	Optigear BM 100	Renolin CLP 150
	-25 +20	CLP PG	VG 220 ¹⁾	Mobil Glygoyle 30	Shell Tivela S 220	Klüberoil GH 6-220			Tribol 800/220	Synlube CLP 220	Optiflex A 220	
	4) -40 0	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32				Cetus PAO 46		
R..., K...(HK...), F..., S...(HS...)	-30 +40	HCE	VG 460		Shell Cassida Fluid GL 460	Klüberoil 4UH1-460 N	Aral Eural Gear 460				Optileb GT 460	
	-20 +40	E	VG 460			Klüberbio CA2-460	Aral Degol BAB 460				Optisynth BS 460	
W...(HW...)	Standard -20 +40	SEW PG	VG 460 ²⁾			Klüber SEW HT-460-5						
	4) -40 +10	API GL5	SAE 75W90 (-VG 100)	Mobilube SHC 75 W90-LS		Klüberoil UH1 6-460						
	-20 +40	CLP PG	VG 460 ³⁾			Klüberoil GE 46-1200						
R32 R302	-25 +60	DIN 51 818	00	Glygoyle Grease 00	Shell Tivela GL 00			BP Energol LS-EP 00		Multifak 6833 EP 00	Longtime PD 00	Renolin SF 7 - 041
	Standard -15 +40		000 - 0	Mobilux EP 004	Shell Alvania GL 00		Aralub MFL 00			Multifak EP 000		



9.2 Lubricant fill quantities

The specified fill quantities are **recommended values**. The precise values vary depending on the number of stages and gear ratio. When filling, it is essential to check the **oil level plug since it indicates the precise oil capacity**.

The following tables show guide values for lubricant fill quantities in relation to the mounting position M1 ... M6.

Helical (R) gear units

Gear unit type R..., R..F	Fill quantity in liters					
	M1 ¹⁾	M2 ¹⁾	M3	M4	M5	M6
R07/R07F	0.12	0.20	0.20	0.20	0.20	0.20
R17/R17F	0.25	0.55	0.35	0.55	0.35	0.35
R27/R27F	0.25/0.40	0.70	0.50	0.70	0.50	0.50
R37/R37F	0.30/0.95	0.85	0.95	1.05	0.75	0.95
R47/R47F	0.70/1.50	1.60	1.50	1.65	1.50	1.50
R57/R57F	0.80/1.70	1.90	1.70	2.10	1.70	1.70
R67/R67F	1.10/2.30	2.60/3.50	2.80	3.20	1.80	2.00
R77/R77F	1.20/3.00	3.80/4.10	3.60	4.10	2.50	3.40
R87/R87F	2.30/6.0	6.7/8.2	7.2	7.7	6.3	6.5
R97	4.60/9.8	11.7/14.0	11.7	13.4	11.3	11.7
R107	6.0/13.7	16.3	16.9	19.2	13.2	15.9
R137	10.0/25.0	28.0	29.5	31.5	25.0	25.0
R147	15.4/40.0	46.5	48.0	52.0	39.5	41.0
R167	27.0/70.0	82.0	78.0	88.0	66.0	69.0
Gear unit type RF.. / RM..	Fill quantity in liters					
	M1 ¹⁾	M2 ¹⁾	M3	M4	M5	M6
RF07	0.12	0.20	0.20	0.20	0.20	0.20
RF17	0.25	0.55	0.35	0.55	0.35	0.35
RF27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
RF37	0.35/0.95	0.90	0.95	1.05	0.75	0.95
RF47	0.65/1.50	1.60	1.50	1.65	1.50	1.50
RF/RM57	0.80/1.70	1.80	1.70	2.00	1.70	1.70
RF/RM67	1.20/2.50	2.70/3.60	2.70	2.60	1.90	2.10
RF/RM77	1.20/2.60	3.80/4.10	3.30	4.10	2.40	3.00
RF/RM87	2.40/6.0	6.8/7.9	7.1	7.7	6.3	6.4
RF/RM97	5.1/10.2	11.9/14.0	11.2	14.0	11.2	11.8
RF/RM107	6.3/14.9	15.9	17.0	19.2	13.1	15.9
RF/RM137	9.5/25.0	27.0	29.0	32.5	25.0	25.0
RF/RM147	16.4/42.0	47.0	48.0	52.0	42.0	42.0
RF/RM167	26.0/70.0	82.0	78.0	88.0	65.0	71.0

1) The output end gear unit of multi-stage gear units must be filled with the larger oil volume.



Helical (RX) gear units

Gear unit type RX..	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RX57	0.60	0.80	1.30	1.30	0.90	0.90
RX67	0.80	0.80	1.70	1.90	1.10	1.10
RX77	1.10	1.50	2.60	2.70	1.60	1.60
RX87	1.70	2.50	4.80	4.80	2.90	2.90
RX97	2.10	3.40	7.4	7.0	4.80	4.80
RX107	3.90	5.6	11.6	11.9	7.7	7.7
Gear unit type RXF..	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF57	0.50	0.80	1.10	1.10	0.70	0.70
RXF67	0.70	0.80	1.50	1.40	1.00	1.00
RXF77	0.90	1.30	2.40	2.00	1.60	1.60
RXF87	1.60	1.95	4.90	3.95	2.90	2.90
RXF97	2.10	3.70	7.1	6.3	4.80	4.80
RXF107	3.10	5.7	11.2	9.3	7.2	7.2

Parallel shaft helical (F) gear units

F.., FA..B, FH..B, FV..B:

Gear unit type	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.60	3.50	2.10	3.50	2.80	2.90
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	40.5	54.5	34.0	61.0	46.3	47.0
F..157	69.0	104.0	63.0	105.0	86.0	78.0

FF..:

Gear unit type	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
FF27	0.60	0.80	0.65	0.70	0.60	0.60
FF37	1.00	1.25	0.70	1.30	1.00	1.10
FF47	1.60	1.85	1.10	1.90	1.50	1.70
FF57	2.80	3.50	2.10	3.70	2.90	3.00
FF67	2.70	3.80	1.90	3.80	2.90	3.20
FF77	5.9	7.3	4.30	8.1	6.0	6.3
FF87	10.8	13.2	7.8	14.1	11.0	11.2
FF97	19.0	22.5	12.6	25.6	18.9	20.5
FF107	25.5	32.0	19.5	38.5	27.5	28.0
FF127	41.5	55.5	34.0	63.0	46.3	49.0
FF157	72.0	105.0	64.0	106.0	87.0	79.0



FA.., FH.., FV.., FAF.., FHF.., FVF.., FAZ.., FHZ.., FVZ..:

Gear unit type	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.70	3.50	2.10	3.40	2.90	3.00
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	39.0	54.5	34.0	61.0	45.0	46.5
F..157	68.0	103.0	62.0	104.0	85.0	77.0

**Helical-bevel (K)
gear units**

K.., KA..B, KH..B, KV..B:

Gear unit type	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.25	0.95	0.95
K..47	0.80	1.30	1.50	2.00	1.60	1.60
K..57	1.20	2.30	2.50	2.80	2.60	2.40
K..67	1.10	2.40	2.60	3.45	2.60	2.60
K..77	2.20	4.10	4.40	5.8	4.20	4.40
K..87	3.70	8.0	8.7	10.9	8.0	8.0
K..97	7.0	14.0	15.7	20.0	15.7	15.5
K..107	10.0	21.0	25.5	33.5	24.0	24.0
K..127	21.0	41.5	44.0	54.0	40.0	41.0
K..157	31.0	62.0	65.0	90.0	58.0	62.0
K..167	33.0	95.0	105.0	123.0	85.0	84.0
K..187	53.0	152.0	167.0	200	143.0	143.0

KF..:

Gear unit type	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
KF37	0.50	1.10	1.10	1.50	1.00	1.00
KF47	0.80	1.30	1.70	2.20	1.60	1.60
KF57	1.30	2.30	2.70	3.15	2.90	2.70
KF67	1.10	2.40	2.80	3.70	2.70	2.70
KF77	2.10	4.10	4.40	5.9	4.50	4.50
KF87	3.70	8.2	9.0	11.9	8.4	8.4
KF97	7.0	14.7	17.3	21.5	15.7	16.5
KF107	10.0	21.8	25.8	35.1	25.2	25.2
KF127	21.0	41.5	46.0	55.0	41.0	41.0
KF157	31.0	66.0	69.0	92.0	62.0	62.0



KA.., KH.., KV.., KAF.., KHF.., KVF.., KAZ.., KHZ.., KVZ..:

Gear unit type	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.40	1.00	1.00
K..47	0.80	1.30	1.60	2.15	1.60	1.60
K..57	1.30	2.30	2.70	3.15	2.90	2.70
K..67	1.10	2.40	2.70	3.70	2.60	2.60
K..77	2.10	4.10	4.60	5.9	4.40	4.40
K..87	3.70	8.2	8.8	11.1	8.0	8.0
K..97	7.0	14.7	15.7	20.0	15.7	15.7
K..107	10.0	20.5	24.0	32.4	24.0	24.0
K..127	21.0	41.5	43.0	52.0	40.0	40.0
K..157	31.0	66.0	67.0	87.0	62.0	62.0
KH167	33.0	95.0	105.0	123.0	85.0	84.0
KH187	53.0	152.0	167.0	200	143.0	143.0

Spiroplan® (W) gear units

The fill quantity of Spiroplan® gear units does not vary, irrespective of their mounting position:

Gear unit type	Fill quantity in liters, regardless of mounting position
W..10	0.16
W..20	0.26
W..30	0.50

Helical-worm (S) gear units

S..:

Gear unit type	Fill quantity in liters					
	M1	M2	M3 ¹⁾	M4	M5	M6
S37	0.25	0.40	0.50	0.55	0.40	0.40
S47	0.35	0.80	0.70/0.90	1.00	0.80	0.80
S57	.50	1.20	1.00/1.20	1.45	1.30	1.30
S67	1.00	2.00	2.20/3.10	3.10	2.60	2.60
S77	1.90	4.20	3.70/5.4	5.9	4.40	4.40
S87	3.30	8.1	6.9/10.4	11.3	8.4	8.4
S97	6.8	15.0	13.4/18.0	21.8	17.0	17.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

SF..:

Gear unit type	Fill quantity in liters					
	M1	M2	M3 ¹⁾	M4	M5	M6
SF37	0.25	0.40	0.50	0.55	0.40	0.40
SF47	0.40	0.90	0.90/1.05	1.05	1.00	1.00
SF57	0.50	1.20	1.00/1.50	1.55	1.40	1.40
SF67	1.00	2.20	2.30/3.00	3.20	2.70	2.70
SF77	1.90	4.10	3.90/5.8	6.5	4.90	4.90
SF87	3.80	8.0	7.1/10.1	12.0	9.1	9.1
SF97	7.4	15.0	13.8/18.8	22.6	18.0	18.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.



SA..., SH..., SAF..., SHF..., SAZ..., SHZ...:

Gear unit type	Fill quantity in liters					
	M1	M2	M3 ¹⁾	M4	M5	M6
S..37	0.25	0.40	0.50	0.50	0.40	0.40
S..47	0.40	0.80	0.70/0.90	1.00	0.80	0.80
S..57	0.50	1.10	1.00/1.50	1.50	1.20	1.20
S..67	1.00	2.00	1.80/2.60	2.90	2.50	2.50
S..77	1.80	3.90	3.60/5.0	5.8	4.50	4.50
S..87	3.80	7.4	6.0/8.7	10.8	8.0	8.0
S..97	7.0	14.0	11.4/16.0	20.5	15.7	15.7

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.



10 Appendix

10.1 Index of changes

The following additions and changes have been made compared to the previous edition of the "Explosion-Proof Gear Units R..7, F..7, K..7, S..7, SPIROPLAN® W" (publication number: 1055520x, edition 11/2002) operating instructions:

General additions and corrections.

Mechanical installation

- Installing the gear unit: Data on flatness error
- Installing torque arms for mounted gear units: Data on retaining bolts
- Mounted gear units with shrink disks: Information on assembly / removal has been added
- Mounted gear units with TorqLOC®
- AM adapter coupling: Point A

Inspection and maintenance

- Lubricant change intervals

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Assembly Sales Service	Lahti	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 3 589-300 Fax +358 3 7806-211 http://www.sew-eurodrive.fi sew@sew-eurodrive.fi
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Greece			
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Lebanon			
Sales	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com



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	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferryroad Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
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Serbia and Montenegro			
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	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
Additional addresses for service in the USA provided on request!			
Venezuela			
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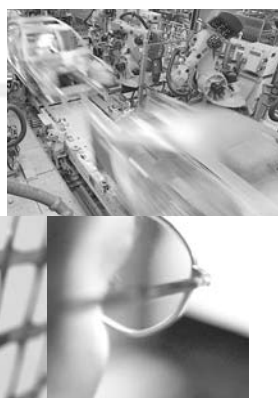
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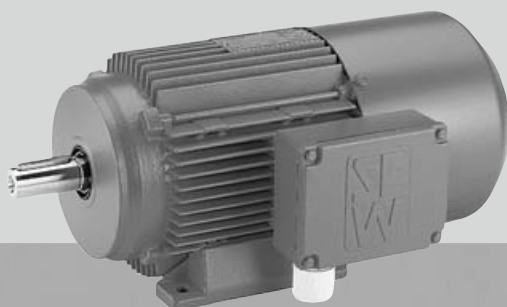
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AC Motors DR/DV/DT/DTE/DVE
Asynchronous Servomotors CT/CV

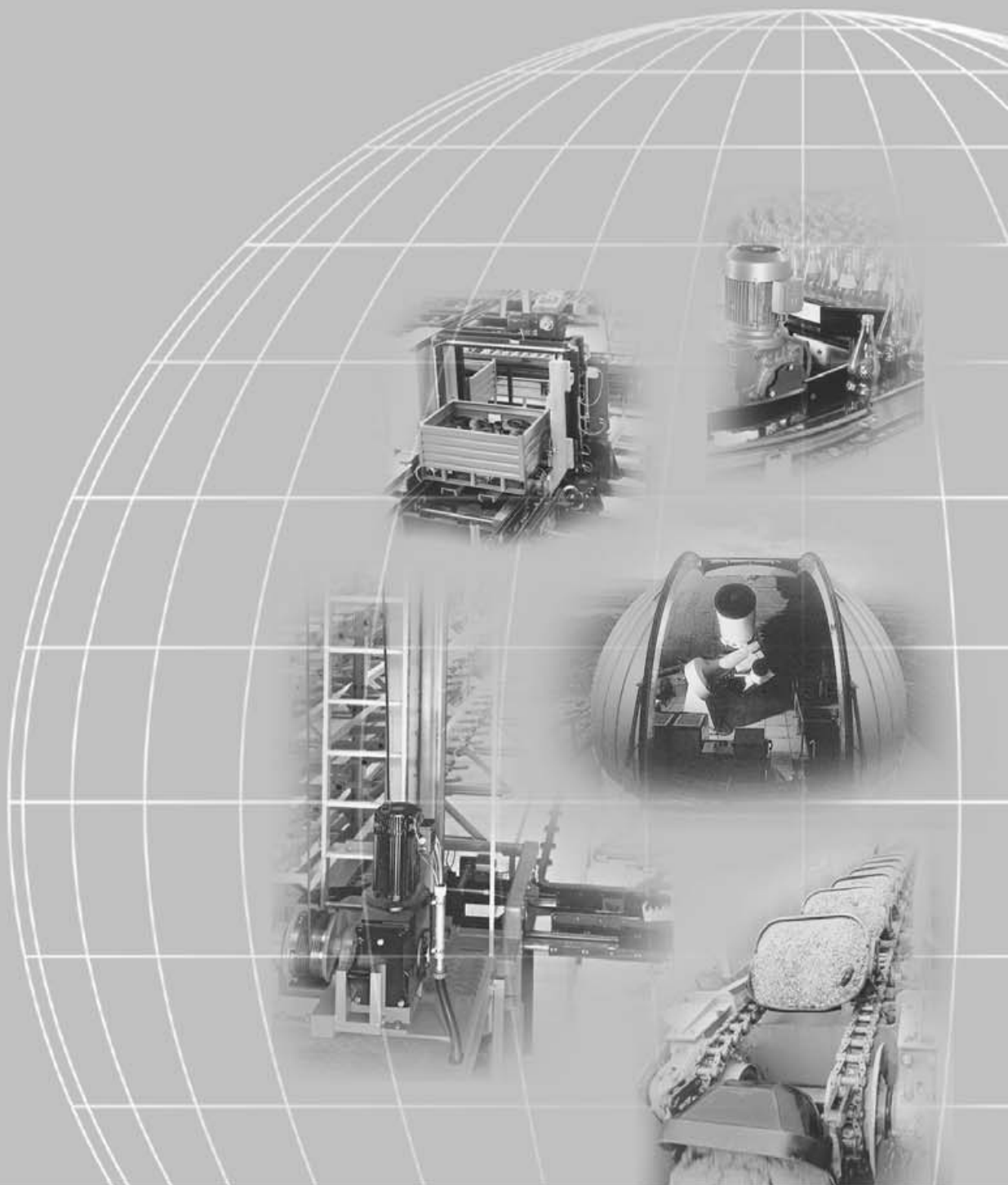
Edition

02/2003



Operating Instructions

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SEW-EURODRIVE





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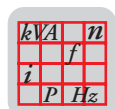
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1 Important Notes

Safety and warning instructions

Always follow the safety and warning instructions contained in this publication!



Electrical hazard

Possible consequences: Severe or fatal injuries.



Hazard

Possible consequences: Severe or fatal injuries.



Hazardous situation

Possible consequences: Slight or minor injuries.



Harmful situation

Possible consequences: Damage to the drive and the environment.



Tips and useful information.



A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that you adhere to the information in the operating instructions. Consequently, read the operating instructions before you start operating the drive!

The operating instructions contain important information about service; as a result, they should be kept in the vicinity of the unit.

Waste disposal



This product consists of:

- Iron
- Aluminum
- Copper
- Plastic
- Electronics components

Please dispose of the parts in accordance with the applicable regulations.



2 Safety Notes

Preliminary remarks

The following safety notes are principally concerned with the use of motors. When operating **geared motors**, please also refer to the safety notes for gear units in the corresponding operating instructions.

Please also pay attention to the supplementary safety notes in the individual sections of these operating instructions.

General information

During and after operation, motors and geared motors have live and moving parts and their surfaces may be hot.

All work related to transportation, putting into storage, setting up/mounting, connection, startup, maintenance and repair should only be performed by trained personnel observing

- the corresponding detailed operating instructions and wiring diagrams,
- the warning and safety signs on the motor/geared motor,
- the specific regulations and requirements for the system and
- national/regional regulations governing safety and the prevention of accidents.

Severe injuries and damage to property may result from

- incorrect use,
- incorrect installation or operation,
- removal of required protective covers or the housing when this is not permitted.

Designated use

These electric motors are intended for industrial systems. They comply with the applicable standards and regulations and meet the requirements of the Low Voltage Directive 73/23/EEC.

The technical data and the information about permitted conditions can be found on the nameplate and in the documentation.

It is essential to observe all specified information!

Transportation

Inspect the shipment for any damage in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

Tighten screwed in transport lugs firmly. They are only designed for the weight of the motor/geared motor; do not attach any additional loads.

The installed lifting eyebolts are in accordance with DIN 580. The loads and regulations specified in that document must always be observed. If the geared motor is equipped with two suspension eye lugs or lifting eyebolts, then both of the suspension eye lugs should be used for transportation. In this case, the tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

Installation/mounting

Follow the instructions in Sec. 'Mechanical Installation!'

Inspection and maintenance

Follow the instructions in Sec. 'Inspection and Maintenance!'

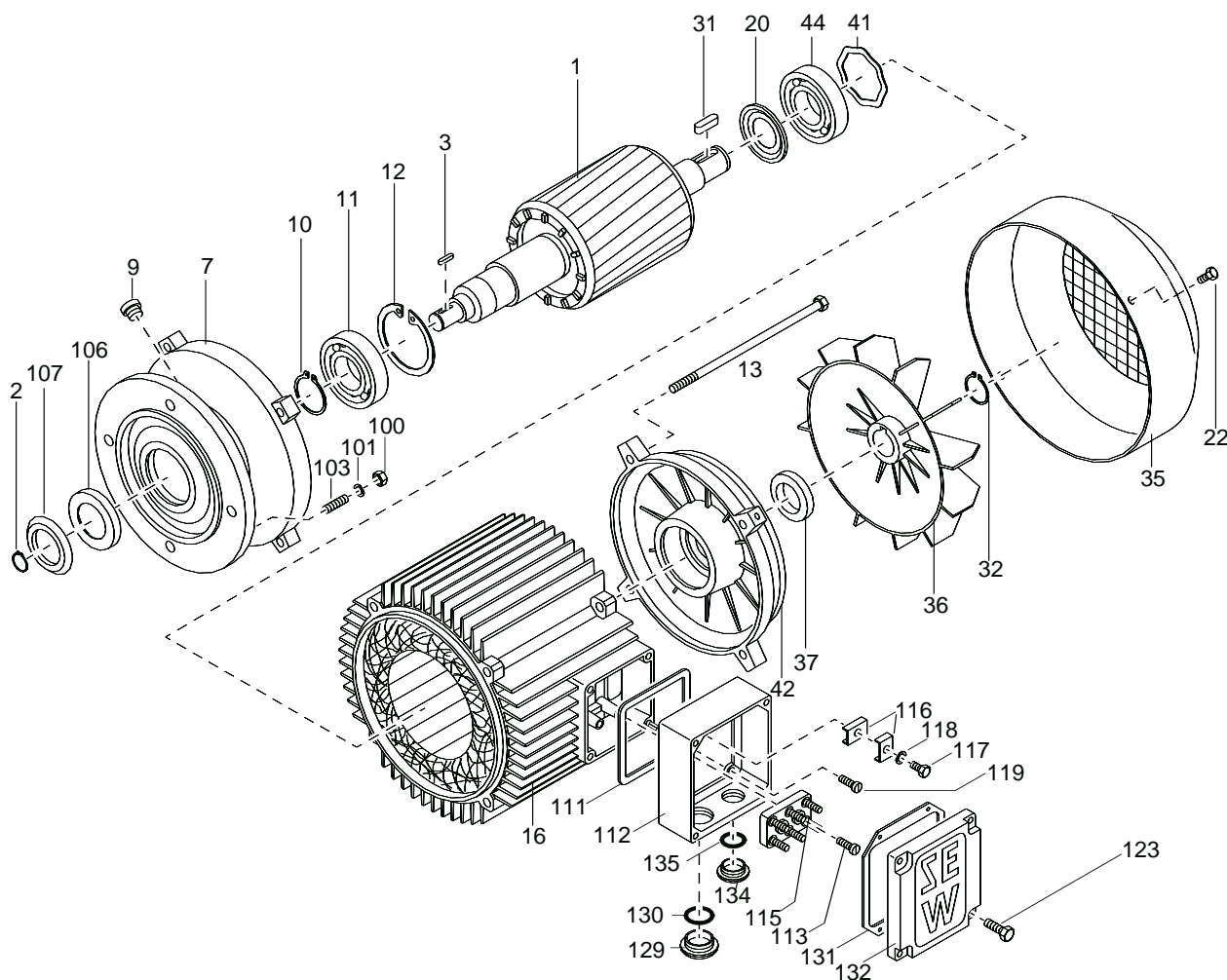


3 Motor Design



The following illustration is intended to explain the general structure. Its purpose is only to make it easier to assign components to the spare parts lists. Discrepancies are possible depending on the motor size and version!

3.1 Configuration principles of AC motors



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Key

1 Rotor, cpl.	31 Key	107 Oil flinger	131 Sealing washer
2 Circlip	32 Circlip	111 Seal	132 Terminal box cover
3 Key	35 Fan guard	112 Terminal box lower part	134 Screw plug
7 Flanged end shield	36 Fan	113 Machine screw	135 Sealing washer
9 Screw plug	37 V-ring	115 Terminal board	
10 Circlip	41 Equalizing ring	116 Terminal yoke	
11 Grooved ball bearing	42 B bearing end shield	117 Hex head screw	
12 Circlip	44 Grooved ball bearing	118 Lock washer	
13 Hex head screw (tie rod)	100 Hex nut	119 Machine screw	
16 Stator, cpl.	101 Lock washer	123 Hex head screw	
20 Nilos ring	103 Stud	129 Screw plug	
22 Hex head screw	106 Oil seal	130 Sealing washer	



3.2 Nameplate, unit designation

Nameplate

Example: Brake motor DFV 160 M4 /BM

SEW-EURODRIVE		Bruchsal / Germany		CE	
Typ	DFV 160 M 4 /BM			3 ~ IEC 34	
Nr.	01.3001234568.0001.00			IM	B5
kW	11 S1			cos φ	0.83
50Hz V	220 - 240 Δ / 380 - 415 Y			A	39.0 / 22.5
60Hz V	240 - 266 Δ / 415 - 460 Y			A	35.5 / 20.5
r/min	1440 / 1740			IP	55
Bremse	V 230 AC			Nm	150
Kg	109			Gleichrichter	BGE1.5
Schmierstoff				EFF	2
Made in Germany 184 103 3.16					

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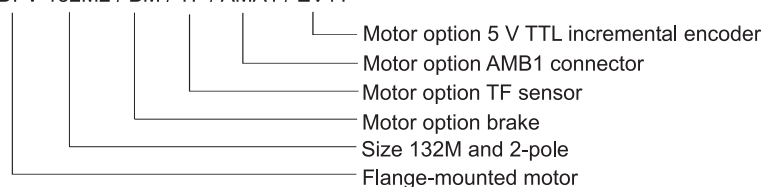
Unit designation

Examples: AC(brake)motors DR/DT/DV/DTE/DVE

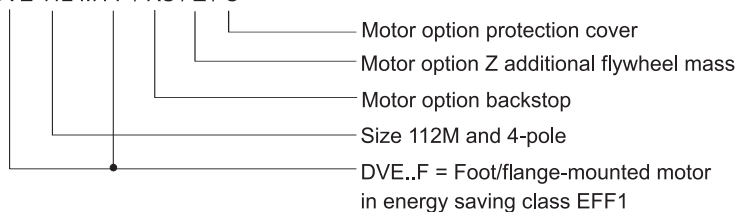
DT 90S4 / BMG / TF / IS



DFV 132M2 / BM / TF / AMA1 / EV1T



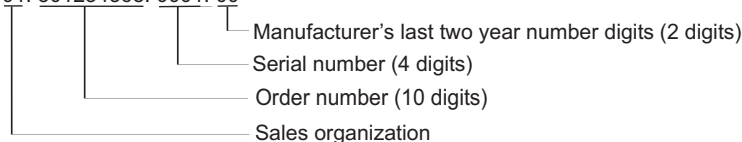
DVE 112 M4 F / RS / Z / C



06150AEN

Example: Factory number

01. 301234568. 0001. 00



05156AEN

**Nameplate**

Example: Servo brake motor CT90L4 / BMG / TF / ES1S

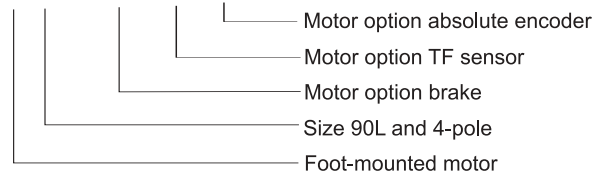
SEW-EURODRIVE		Bruchsal / Germany		CE	
Typ	CT90L4 BMG TF / ES1S			3 ~	IEC 34
Nr.	01.3410069302.0001.00				
Nm	30.5	max. Motor	i	:1	
Nm	10.5	r/min	3000		
		Hz	103	V	345
				A	7.9
IM	B5	kg	28	IP	54
				iso. Kl.	F
Bremse	V 230~	Nm	20	Gleichrichter	BGE 1.5
Schmierstoff					
Made in Germany 186 475 0.13					

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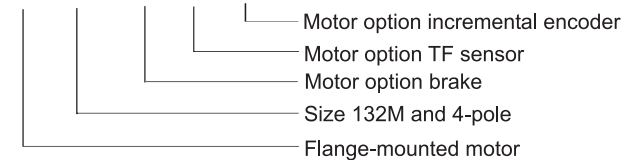
Unit designation

Examples: Servo (brake) motors CT/CV

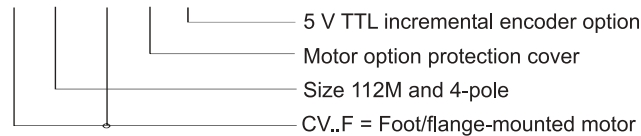
CT 90L4 / BMG / TF / AV1Y



CFV 132M4 / BM / TF / EV1S



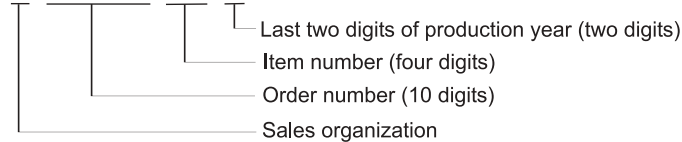
CV 112M4 F / C / ES2R



05158AEN

Example: Factory number

01.3410069302.0001.00



05161AEN



4 Mechanical Installation



It is essential to comply with the safety notes in Sec. 2 during installation!

4.1 Before you begin

The drive may only be installed if

- the entries on the nameplate of the drive and/or the output voltage of the frequency inverter match the voltage supply system,
- the drive is undamaged (no damage caused by transportation or storage) and
- it is certain that the following requirements have been fulfilled:
 - Ambient temperature between -25°C and $+40^{\circ}\text{C}$ ¹
 - No oil, acid, gas, vapors, radiation, etc.
 - Installation altitude max. 1000 m above sea level
 - Note the restrictions for encoders
 - Special designs: drive configured in accordance with the ambient conditions

4.2 Preliminary work

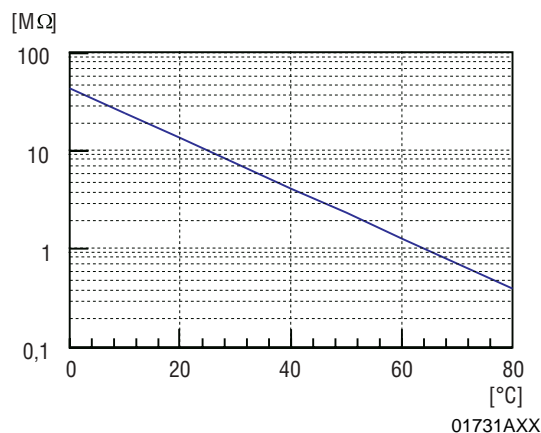
Motor shaft ends must be thoroughly cleaned of anti-corrosion agents, contamination or such like (use a commercially available solvent). Do not allow the solvent to penetrate the bearings or shaft seals – this could cause material damage!

Extended storage of motors

- Please note the reduced grease utilization period of the ball bearings after storage periods exceeding one year.
- Check whether the motor has absorbed moisture as a result of being stored for a long time. Measure the insulation resistance to do this (measuring voltage 500 V).



The insulation resistance (→ following figure) varies greatly depending on the temperature! The motor must be dried if the insulation resistance is not adequate.

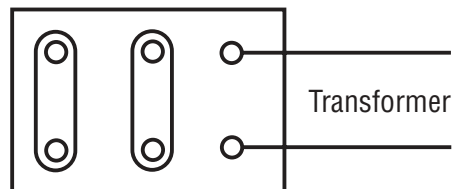


1. Minimum temperature for motors with backstop: -15°C , note that the temperature range of the gear unit may also be limited (→ gear unit operating instructions)

**Drying the motor**

Heat up the motor

- with hot air or
- using an isolation transformer
 - connect the windings in series (→ following figure)
 - auxiliary AC voltage supply max. 10% of the rated voltage with max. 20% of the rated current



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The drying process is finished when the minimum insulation resistance has been exceeded.

Check the terminal box to see whether

- the inside is clean and dry,
- the connections and fastening parts are free from corrosion,
- the joint seals are ok,
- the cable screw fittings are tight, otherwise clean or replace them.

4.3 Installing the motor

The motor or geared motor may only be mounted or installed in the specified mounting position on a level and torsionally rigid support structure which is not subject to shocks.

Carefully align the motor and the driven machine to avoid placing any unacceptable strain on the output shafts (observe permitted overhung load and axial thrust data!).

Do not butt or hammer the shaft extension.

Use an appropriate cover to protect motors in vertical mounting positions from objects or fluids entering (protection cowl C).

Ensure an unobstructed cooling air supply and that air heated by other apparatus cannot be drawn in or reused.

Balance components for subsequent mounting on the shaft with a half key (motor shafts are balanced with a half key).

Any condensation drain holes will be sealed by plastic plugs and should only be opened when necessary; open condensation drain holes are not permitted, since this invalidates higher classes of enclosure.

For brake motors with manual brake release, screw in either the hand lever (with self-reengaging manual brake release) or setscrew (with lockable manual brake release).

Note the following for encoder mounting:

Foot-mounted motors CT/DT71, CT/DT(E)90, CV/DV(E)132M, CV/DV(E)160L must be mounted on supports because the radius of the cover is greater than the shaft height.

For foot-mounted (brake)motors of sizes DTE90L and DVE132M, the shaft height is that of the next larger IEC standard motor (100 mm or 160 mm). The foot dimensions of the DTE90, DVE180 and DVE225 motors deviate from the IEC dimensions, see section "Notes on dimension sheets" in the Geared Motors catalog.



Installation in damp areas or in the open

If possible, arrange the terminal box so the cable entries are pointing downwards.

Coat the threads of cable screw fittings and pocket caps with sealant and tighten them well – then coat them again.

Seal the cable entry well.

Thoroughly clean the sealing surfaces of terminal boxes and terminal box covers prior to reassembly; gaskets must be glued in on one side. Fit new gaskets to replace brittle ones!

Restore the anticorrosive coating if necessary.

Check the enclosure.

4.4 Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 <ul style="list-style-type: none"> • ISO k6 at $\varnothing \leq 50$ mm • ISO m6 at $\varnothing > 50$ mm • Center bore in accordance with DIN 332, shape DR.. 	Centering shoulder tolerance in accordance with DIN 42948 <ul style="list-style-type: none"> • ISO j6 at $\varnothing \leq 230$ mm • ISO h6 at $\varnothing > 230$ mm



5 Electrical Installation



It is essential to comply with the safety notes in Sec. 2 during installation!

Switch contacts in utilization category AC-3 to EN 60947-4-1 must be used for switching the motor and the brake.

5.1 Wiring notes

Comply with the safety notes during installation.

Protection against interfer- ence from brake control systems

Do not route brake cables alongside switched-mode power cables, since otherwise there is a risk of disrupting brake controllers.

Switched-mode power cables include, in particular:

- Output cables from frequency and servo controllers, converters, soft start units and brake units
- Connecting harnesses to braking resistors, etc.

Protection against interfer- ence from motor protection devices

To provide protection against interference from SEW motor protection devices (temperature sensors TF, winding thermostats TH):

- Route separately shielded feeder cables together with switched-mode power lines in one cable
- Do not route unshielded feeder cables together with switched-mode power lines in one cable

5.2 Special aspects for operation with a frequency inverter

When motors are powered by inverters, you must adhere to the wiring instructions issued by the inverter manufacturer. It is essential to pay close attention to the operating instructions for the frequency inverter.

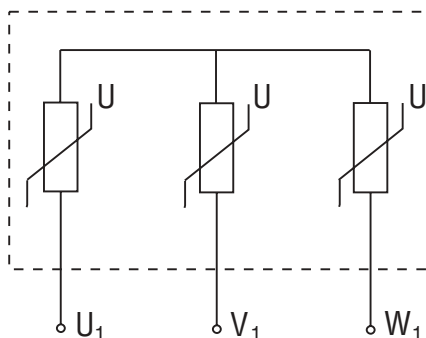
5.3 Special aspects of single-phase motors

Bear in mind that SEW single-phase motors are supplied without accessory equipment such as capacitors, starting relays or centrifugal switches (exception: ET56L4 → Sec. 'Single-phase version ET56'). Any parts you need must be obtained from your dealer and connected according to the corresponding instructions and wiring diagrams.



5.4 Special aspects of torque motors and low-speed motors

Due to the design of torque motors and low-speed motors, very high induction voltages may be generated when they are switched off. Consequently, we recommend protection using the varistor circuit shown below. The size of the varistors depends, among other factors, on the starting frequency – note for project planning!



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5.5 Special aspects in switching operation

When the motors are used in switching operation, any possible malfunctions of the switchgear must be excluded by appropriate wiring. According to EN 60204 (electrical equipment of machines), motor windings must have interference suppression in order to protect the numerical or programmable logic controllers. Since it is primarily switching operations which lead to the disruptions, we recommend installing protective circuitry on the switching devices.



5.6 Connecting the motor



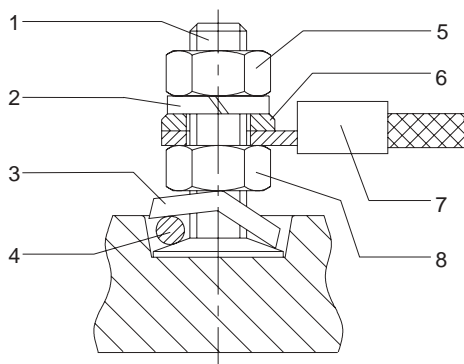
In case of operation with electronic control units, it is essential to adhere to the corresponding operating instructions/wiring diagrams!

Connecting the motor via terminal boxes

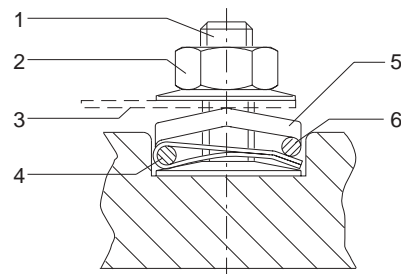
- According to the wiring diagram provided
- Check the cross sections of cables
- Arrange terminal links correctly
- Tighten screw connections and protective earth conductors firmly
- In terminal boxes: Check winding connections and tighten them if necessary

Small connection parts

Please note: In the case of motor sizes DR63 - DV132S, the small connection parts (connection nuts for feeder cables, terminal links, lock washer and washers) are supplied in a bag. Depending on the type of terminal board, install the parts in accordance with the figure below. In the connection on the right in the figure below, the second retaining nut, the lock washer and the washer are not used. The external connection (6) can be installed directly or as a lug (4) below the terminal washer (5).



- 1 Terminal stud
- 2 Lock washer
- 3 Terminal washer
- 4 Motor terminal lead
- 5 Top nut
- 6 Washer
- 7 External connection
- 8 Bottom nut



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- 1 Terminal stud
- 2 Hex nut with flange
- 3 Terminal link
- 4 Motor with Stock connection terminal
- 5 Terminal washer
- 6 External connection



The asynchronous servomotors of the CT/CV series will be shipped with switched terminal links according to the nameplate.

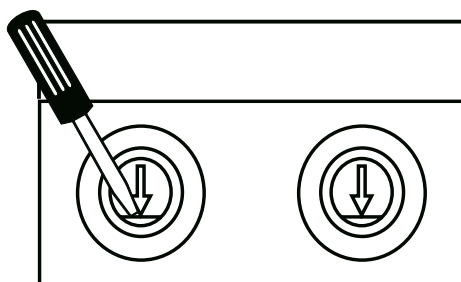


5.7 Preparing motor sizes 56 and 63



Important: Wear safety glasses – danger of injury from fragments!

- Put on the terminal box cover and tighten screws
- Define which cable entries to open
- Open the cable entries
 - with a chisel or similar (hold at an angle)
 - by tapping lightly with a hammer



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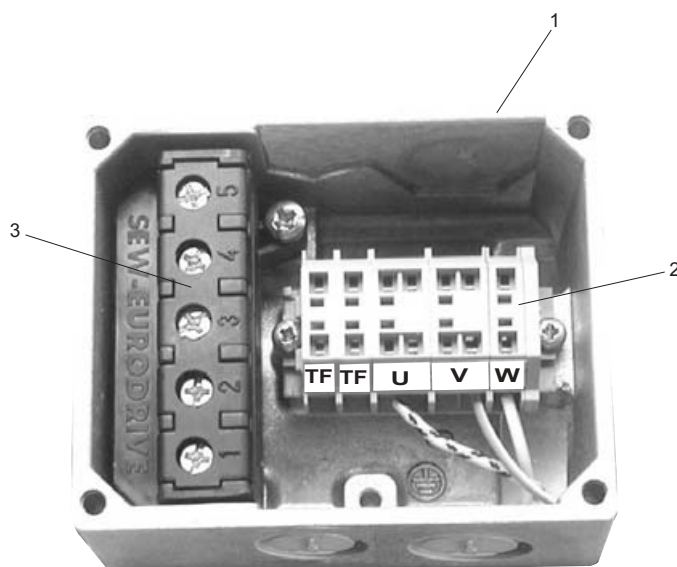


Caution – Do not punch through into the inside of the terminal box!

- Open the terminal box, remove any pieces that may have broken off
- Secure the cable screw fittings with the supplied lock nuts

5.8 Connecting motor DT56...+/BMG

The motor has a star point with three fixed connection points in the winding overhang. The power supply leads (L1, L2, L3) are connected to a spring cage terminal block (2) in the terminal box (1). The brake BMG02 is controlled using the brake rectifier BG1.2 (3). As an alternative, the brake can be controlled from the switch cabinet using BM series rectifiers.



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5.9 Single-phase version ET56

The single-phase motor ET56 is supplied with a mounted and connected running capacitor :

1~230 V, 50 Hz $C_B = 4 \mu\text{F}$

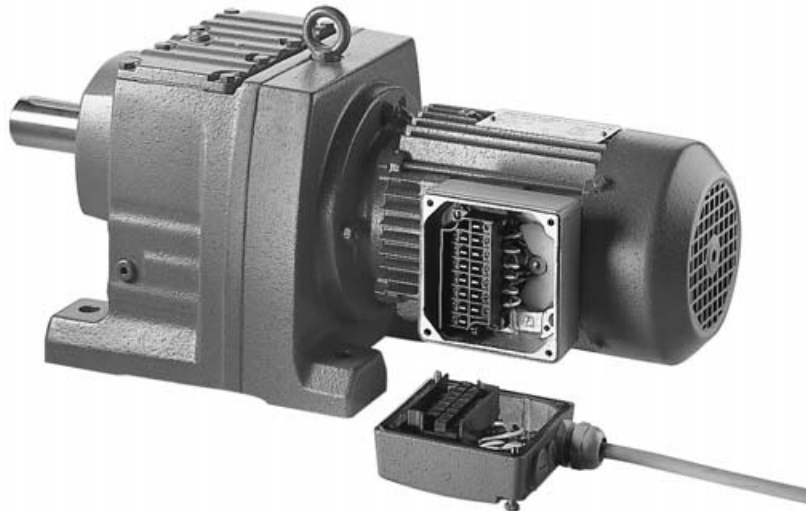
1~230 V, 60 Hz $C_B = 4 \mu\text{F}$

1~110 V, 60 Hz $C_B = 20 \mu\text{F}$



No full-load startup is possible with the running capacitor alone! The single-phase motor cannot be combined with a TF.

5.10 Connecting the motor using the IS plug connector



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The IS plug connector is supplied with its base fully wired-up, including additional features such as a brake rectifier. The upper section of the IS connector is included in the scope of delivery and must be connected as shown in the wiring diagram.

The IS plug connection has CSA approval up to 600 V. (Note for application according to CSA regulations: Tighten the M3 terminal screws to a torque of 0.5 Nm! See the following table for American Wire Gauge (AWG) line cross sections!)

Line cross section

Make sure the type of line corresponds to the applicable regulations. The rated currents are specified on the motor nameplate. The line cross sections that can be used are listed in the following table.

Without variable terminal link	With variable terminal link	Link cable	Double assignment (motor and brake/SR)
0.25 - 4.0 mm ²	0.25 - 2.5 mm ²	max. 1.5 mm ²	max. 1 x 2.5 and 1 x 1.5 mm ²
23 - 12 # AWG	23 - 14 # AWG	max. 16 # AWG	max. 1 x 14 # and 1 x 16 # AWG



Wiring the upper section of the plug connector

- Loosen the housing cover screws
 - Remove the housing cover
- Remove the screws from the upper section of the plug connector
 - Remove the upper section of the plug connector from the cover
- Strip the insulation off the connection lead
 - Strip about 9 mm insulation off the connecting leads
- Pass the cable through the cable screw fitting

Wiring as shown in wiring diagram DT82, DT83

- Connect the lines as shown in the wiring diagram
 - Tighten the clamping screws carefully!
- Install the plug connector (→ Sec. 'Installing the plug connector')

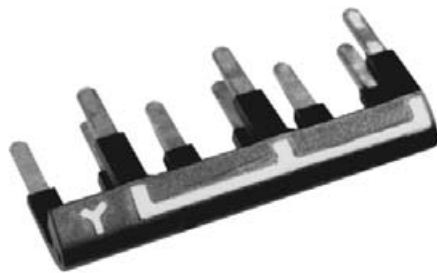
Wiring as shown in wiring diagram DT81

For Δ / Δ startup:

- Connect with six lines
 - Tighten the clamping screws carefully!
 - Motor contactors in the switch cabinet
- Install the plug connector (→ Sec. 'Installing the plug connector')

For Δ or Δ operation:

- Connect as shown in the wiring diagram
- Install the variable terminal link as shown in the following figures according to desired motor operation (m or W)
- Install the plug connector (→ Sec. 'Installing the plug connector')



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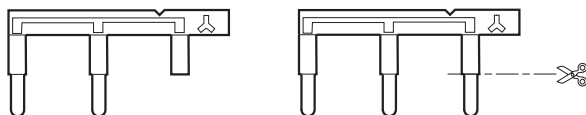


Connecting the motor using the IS plug connector

Brake control system BSR – preparing the variable terminal link

For Δ operation:

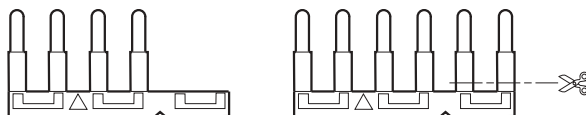
On the W side of the variable terminal link as shown in the following figure: Remove only the bare metal pin of the marked prong horizontally – touch guard!



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For Δ operation:

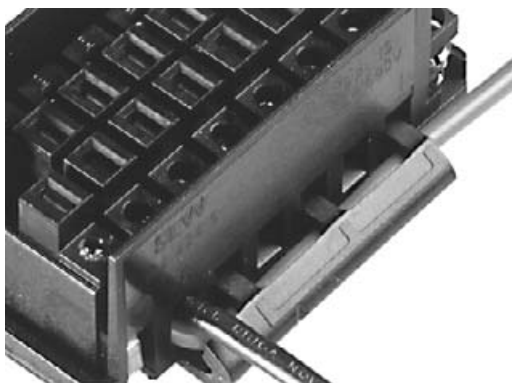
On the m side of the variable terminal link as shown in the following figure: Completely remove two prongs horizontally.



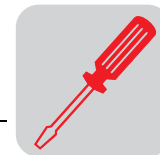
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Wiring according to the DT81 wiring diagram for W or m operation with double terminal assignment

- At terminal point for double assignment:
 - Connect the link cable
- When operation is as required:
 - Insert the link cable in the variable terminal link
- Install the variable terminal link
- At terminal point for double assignment:
 - Connect the motor lead above the variable terminal link
- Connect the other lines as shown in the wiring diagram
- Install the plug connector (→ Sec. 'Installing the plug connector')



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Installing the plug connector

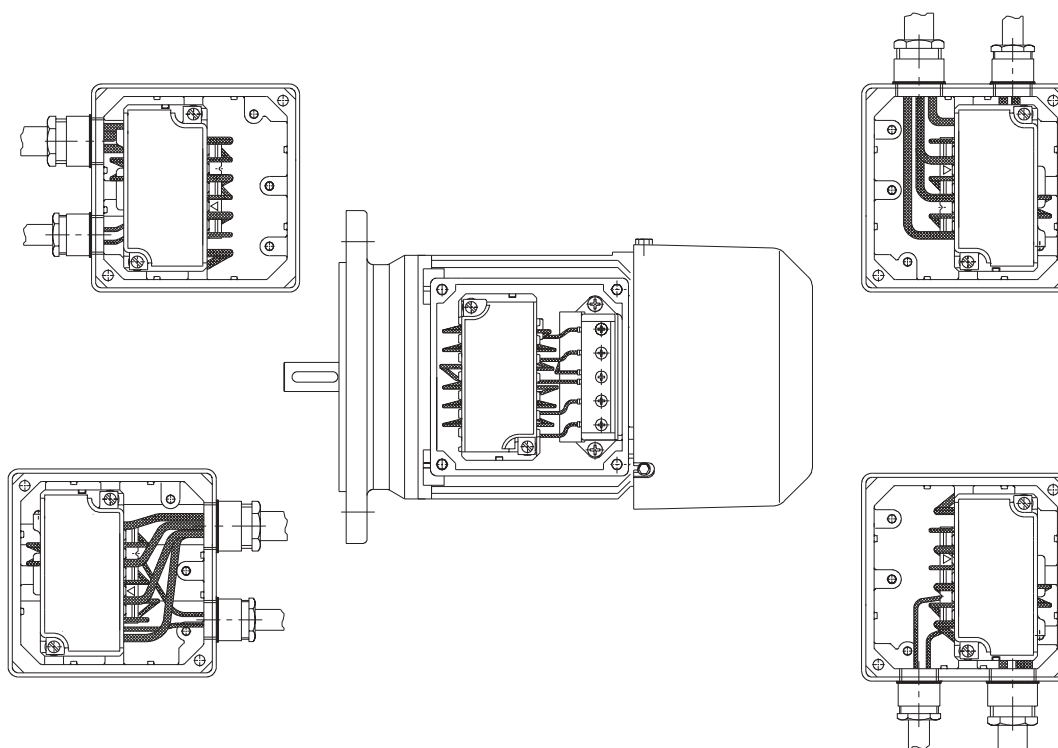
The housing cover of the IS plug connector can be screwed onto the lower section of the plug connector depending on the required position of the cable lead. The upper section of the plug connector shown in the following figure must first be installed in the housing cover so it will match the position of the lower section of the plug connector:

- Define the required mounting position
- Install the upper section of the plug connector into the housing cover in accordance with the mounting position
- Close the plug connector
- Tighten the cable screw fitting



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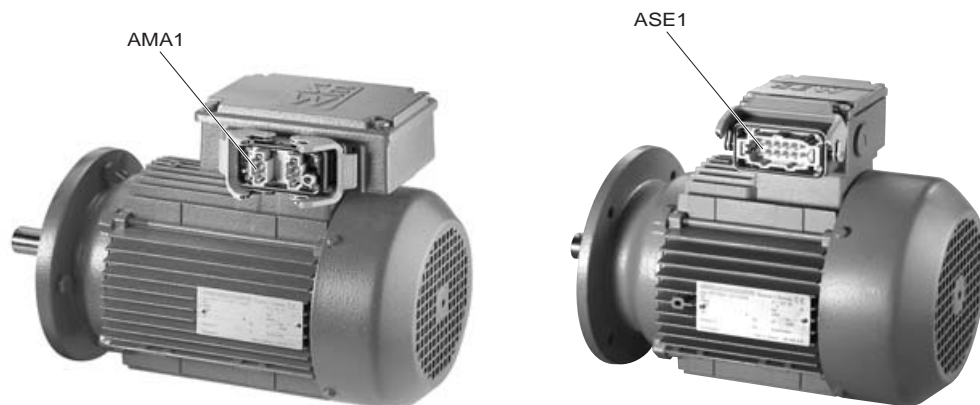
Mounting position of the upper section of the plug connector in the housing cover



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5.11 Connecting the motor using plug connectors AS.. and AM..



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Plug connectors AS.. or AM.. are mounted on the side of the terminal box. They are fastened onto the terminal box either with two clips as in the AMA1, AMB1 and ASB1 or with one clip as in the AMD1, AME1, ASD1 and ASE1.

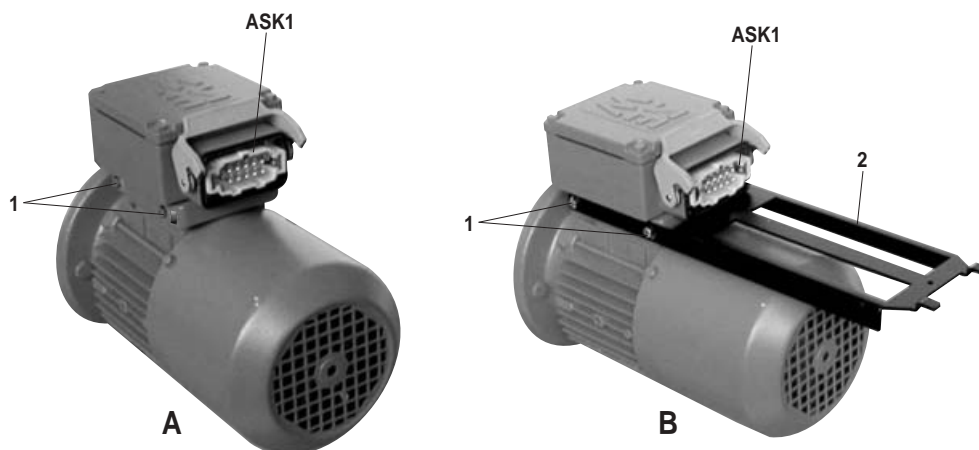


The ASD1 and ASE1 types with single clip closure correspond to the DESINA regulation issued by the Association of German Machine Tool Manufacturers (VDW).

The ASA1 / ASD1 or ASB1 / ASE1 and the AMA1 / AMD1 are supplied with their bases fully wired up, including additional features such as a brake rectifier.

The customer is responsible for obtaining the upper sections of the connectors from the dealer and connecting them in accordance with the wiring diagrams (supplied with the motor).

5.12 Connecting the motor using ASK1 plug connector



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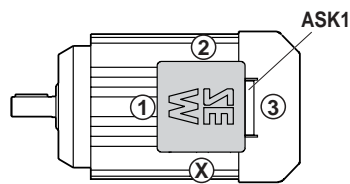
Drives with ASK1 plug connector are certified according to the ECOFAST specification (version 1.1). Switchgear or control units which also have to be certified can be connected to SEW-EURODRIVE motors using a pre-fabricated system cable or a carrier plate (installation integrated in the motor → Fig. B). The ASK1 plug connector with single-clip locking is mounted on the side of the terminal box and fully wired, including additional features such as a brake rectifier.



- The system cable pre-fabricated according to the ECOFAST specification must be obtained from a specialist retailer by the customer.
- For installation integrated in the motor according to the ECOFAST specification, the customer must obtain the carrier plate from SEW-EURODRIVE by quoting part number 0187 390 3. Carrier plates from other manufacturers do not fit on SEW-EURODRIVE motors.

Position of the plug connector

Possible positions of the ASK1 plug connector are "X" (= standard position), "1", "2" or "3." Unless specified otherwise, the unit is supplied with the plug connector in position "3." For installation integrated into the motor (using the carrier plate), units are supplied with the plug connector in position "3" only.



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Installing the carrier plate

- Loosen and remove four retaining screws (1) below the terminal box (→ Fig. A)
- Place the carrier plate (2) against the bores for the retaining screws and install it by tightening the four retaining screws (1) (→ Fig. B)



5.13 Connecting the brake

The brake is released electrically. The brake is applied mechanically when the voltage is switched off.



Comply with the applicable regulations issued by the relevant employer's liability insurance association regarding phase failure protection and the associated circuit/circuit modification!

- Connect the brake according to the wiring diagram supplied with the brake.
- **Note:** In view of the DC voltage to be switched and the high level of current load, it is essential to use either special brake contactors or AC contactors with contacts in utilization category AC-3 to EN 60947-4-1.
- If necessary, for version with manual brake release you can install
 - hand lever (for manually disengaging brake)
 - or manual brake release screw (for fixing brake in the disengaged position)
- After a new brake disk has been fitted, the maximum braking torque will be achieved after a few cycles.

Connecting the brake control system

The DC disk brake is powered from a brake control system with protection circuit. This control is accommodated in the terminal box / IS lower part or must be installed in the switch cabinet (→ Sec. 'Wiring notes').



- **Check the line cross sections - braking currents (→ Sec. 'Technical Data')**
- Connect the brake control system according to the wiring diagram supplied with the brake
- For motors in thermal classification H, install the brake rectifier in the switch cabinet!



5.14 Accessory equipment



Connect supplied accessory equipment according to the wiring diagrams included.

Temperature sensor TF



Do not apply any voltage!

The positive temperature coefficient (PTC) thermistors comply with DIN 44082.

Resistance measurement (measuring instrument with $V \leq 2.5 \text{ V}$ or $I < 1 \text{ mA}$):

- Standard measured values: 20...500 Ω , thermal resistance $> 4000 \text{ } \Omega$
- Measured values pole-changing with separate winding: 40...1000 Ω , thermal resistance $> 4000 \text{ } \Omega$

Winding thermostats TH

The thermostats are connected in series as standard and open when the permitted winding temperature is exceeded. They can be connected in the drive monitoring loop.

	V_{AC}		V_{DC}	
Voltage V [V]	250	400	60	24
Current ($\cos \varphi = 1.0$) [A]	2.5	0.75	1.0	1.6
Current ($\cos \varphi = 0.6$) [A]	1.6	0.5		
Contact resistance max. 1 ohm at 5 V = / 1 mA				

Forced cooling fan

Motor size 71 - 132S

VS System

- 1 x 230 V_{AC} , 50 Hz
- Connection in separate terminal box
- Max. connection cross section 3 x 1.5 mm^2
- Cable screw fitting M16x1.5



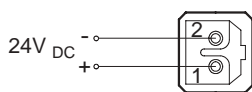
Please refer to the VS wiring diagram for information about connecting the VS system (order number: 0975 8385).



VR System

- $24\text{ V}_{\text{DC}} \pm 20\%$
- Connection via plug connector
- Max. connection cross section $3 \times 1\text{ mm}^2$
- Cable screw fitting Pg7 with inside diameter 7 mm

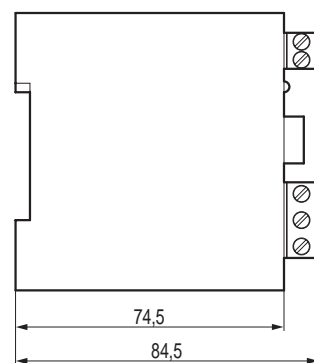
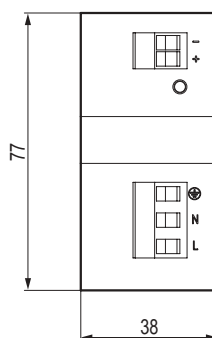
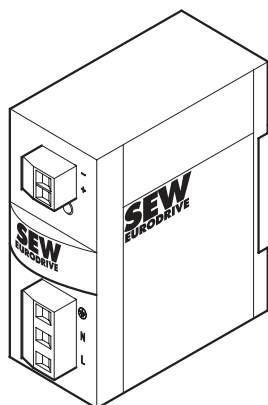
The **VR forced cooling fan** is available for 24 V DC voltage and for 100 ... 240 V AC voltage.



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The AC voltage type includes a VR forced cooling fan and the UWU51A switch-mode power supply (→ following figure).

- Input: 100 ... 240 V_{AC} -6% / +10%, 50/60 Hz
- Output: 24 V_{DC} -1% / +2%, 1.25 A
- Connection: Screw terminals 0.2 ... 2.5 mm², separable
- Enclosure: IP20; attachment to EN 50022 DIN rail in the switch cabinet



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Please refer to the VR wiring diagram for information about connecting the VR forced cooling fan (order number: 0880 3198)



Motor size 132M - 280

V system

- 3 x 400 V_{AC}, 50 Hz
- Connection in separate terminal box
- Max. connection cross section 4 x 1.5 mm²
- Cable screw fitting M16x1.5



Please refer to the VS or V wiring diagram for information about connecting the VS and V systems (order no: 0975 8385).

A transformer may be present in the VS system in order to adapt to a voltage other than the standard. VS and V systems are also available for 60 Hz

Encoder overview

Encoder	for SEW motor	Type of encoder	Shaft	Specifica- tion	Supply	Signal
EH1T ¹⁾	DR63...	Encoder	Hollow shaft	-	5 V _{DC} regulated	5 V _{DC} TTL/RS-422
EH1S ²⁾					24 V _{DC}	1 V _{ss} sin/cos
EH1R						5 V _{DC} TTL/RS-422
EH1C						24 V _{DC} HTL
ES1T ¹⁾	CT/DT/CV/DV71...100 DTE/DVE90...100	Encoder	Spread shaft	-	5 V _{DC} regulated	5 V _{DC} TTL/RS-422
ES1S ²⁾					24 V _{DC}	1 V _{ss} sin/cos
ES1R						5 V _{DC} TTL/RS-422
ES1C						24 V _{DC} HTL
ES2T ¹⁾	CV/DV(E)112...132S				5 V _{DC} regulated	5 V _{DC} TTL/RS-422
ES2S ²⁾					24 V _{DC}	1 V _{ss} sin/cos
ES2R						5 V _{DC} TTL/RS-422
ES2C						24 V _{DC} HTL
EV1T ¹⁾	CT/CV71...200 DT/DV71...280 DTE/DVE90...225		Solid shaft		5 V _{DC} regulated	5 V _{DC} TTL/RS-422
EV1S ²⁾					24 V _{DC}	1 V _{ss} sin/cos
EV1R						5 V _{DC} TTL/RS-422
EV1C						24 V _{DC} HTL
NV11	DT/DV71...132 DTE/DVE90...132S	Proximity sensor	Solid shaft	A track	24 V _{DC}	1 pulse/revolution, NO contact
NV21				A+B track		
NV12				A track		2 pulses/revolution, NO contact
NV22				A+B track		
NV16				A track		6 pulses/revolution, NO contact
NV26				A+B track		
AV1Y	CT/CV71...200 DT/DV71...280 DTE/DVE90...225	Absolute encoder	Solid shaft	-	15/24 V _{DC}	MSSI interface and 1 V _{ss} sin/cos
AV1H ³⁾		HIPERFACE® encoder			12 V _{DC}	RS485 interface and 1 V _{ss} sin/cos

1) recommended encoder for operation with MOVITRAC[®] 31C

2) recommended encoder for operation with MOVIDRIVE[®]

3) recommended encoder for operation with MOVIDRIVE[®] compact



- Refer to the following wiring diagrams for information about connecting ES1./ES2./EV1. /EH1. encoders and AV1Y / AV1H absolute encoders:
 - Wiring diagram ES1./ES2./EV1./EH1. encoder: Order number 0918 6832
 - Wiring diagram AV1Y absolute encoder: Order number 0918 6808
 - Wiring diagram AV1H absolute encoder: Order number 1052 9705



Maximum vibration load for encoders $\leq 10g \approx 100 \text{ m/s}^2$

Encoder connection

When connecting the encoders to the inverters, always follow the operating instructions for the relevant inverter!

- Maximum line length (inverter - encoder):
 - 100 m with a capacitance per unit length $\leq 120 \text{ nF/km}$
- Core cross section: $0.20 \dots 0.5 \text{ mm}^2$
- Use a shielded cable with twisted pairs of insulated conductors (exception: cable for HTL sensor) and connect the shield over a large surface area at both ends:
 - to the encoder in the cable screw fitting or in the encoder plug
 - to the inverter on the electronics shield clamp or to the housing of the sub D plug
- Route the encoder cables separately from the power cables, maintaining a gap of at least 200 mm.



6 Startup

6.1 Prerequisites for startup



It is essential to comply with the safety notes in Sec. 2 during startup!

***Before startup,
make sure that***

- the drive is undamaged and not blocked,
- the measures stipulated in the 'Preliminary work' section are performed after extended storage,
- all connections have been made properly,
- the direction of rotation of the motor/geared motor is correct
 - (motor rotating clockwise: U, V, W to L1, L2, L3),
- all protective covers have been fitted correctly,
- all motor protection equipment is active and set for the rated motor current,
- in the case of hoist drives, the self-reengaging manual brake release is used,
- there are no other sources of danger present.

***During startup,
make sure that***

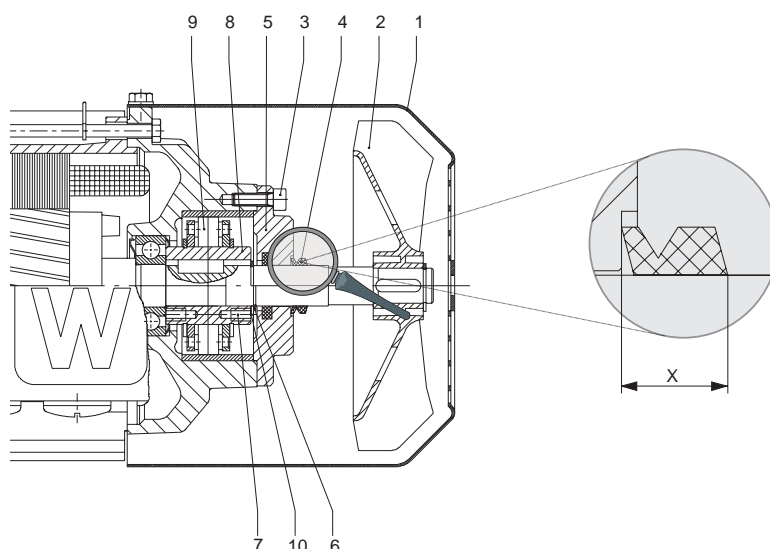
- the motor is running correctly (no overload, no speed fluctuation, no loud noises, etc.),
- the correct braking torque is set according to the specific application (→ Sec. 'Technical data').
- in case of problems (→ Sec. 'Malfunctions').



In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup. A bracket is provided for storing it on the outside of the motor.



6.2 Altering the blocking direction on motors with backstop



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Dimension 'x'
after installation

Motor	Dimension 'x' after installation
DT71/DT80	6.7 mm
DT(E)90/DV(E)100	9.0 mm
DV(E)112/132S	9.0 mm
DV(E)132M - 160M	11.0 mm
DV(E)160L - 225	11.0 mm
DV250 - 280	13.5 mm



Do not start up the motor in the blocking direction (note the phase angle when connecting). Note the direction of rotation of the output shaft and the number of stages when mounting the motor on a gear unit. The backstop can be operated once in the blocking direction at half the motor voltage for checking purposes.

1. **Isolate the motor from supply, safeguarding it against unintentional power-up.**
2. Remove the fan guard (1) and the fan (2); remove the machine screws (3).
3. Remove the V-ring (4) and sealing flange with felt ring (5). (Collect the grease for subsequent use.)
4. Remove the circlip (6) (not with DT71/80); in addition for DV132M-160M: remove the equalizing rings (10).
5. Pull the carrier (8) and wedge element train (9) completely off via the tapped bores (7), turn them by 180° and press them back on.
6. Refill the grease.
7. **Important: Do not exert pressure on or hit the wedge element train – danger of damaging the material!**
8. During the press-in operation – shortly before the wedge element penetrates the locking collar – slowly turn the rotor shaft by hand in the direction of rotation. This allows the wedge element to slide into the locking collar more easily.
9. Install the remaining parts of the backstop by following steps 4. to 2. in reverse order. Note the installation dimension 'x' for the V-ring (4).



7 Malfunctions

7.1 Motor faults

Fault	Possible cause	Remedy
Motor does not start up	Interruption in connecting harness	Check connections, correct if necessary
	Brake does not release	→ Sec. 'Brake faults'
	Fuse blown	Replace fuse
	Motor protection has tripped	Check motor protection is set correctly, rectify any fault
	Motor contactor does not switch, fault in control	Check motor contactor control, rectify any fault
Motor does not start or only with difficulty	Motor designed for delta connection but used in star connection	Correct circuit
	Voltage and frequency deviate markedly from setpoint, at least during switch-on	Provide better power supply system; check cross section of connecting harness
Motor does not start in star connection, only in delta connection	Torque not sufficient in star connection	Switch on directly if delta inrush current is not too great; otherwise use a larger motor or a special version (contact SEW)
	Contact fault on star delta switch	Rectify fault
Incorrect direction of rotation	Motor connected incorrectly	Swap over two phases
Motor hums and has high current consumption	Brake does not release	→ Sec. 'Brake faults'
	Winding defective	Send motor to specialist workshop for repair
	Rotor rubbing	
Fuses blow or motor protection trips immediately	Short circuit in line	Rectify short circuit
	Short circuit in motor	Send motor to specialist workshop for repair
	Lines connected incorrectly	Correct circuit
	Ground fault on motor	Send motor to specialist workshop for repair
Severe speed loss under load	Overload	Perform power measurement, use larger motor or reduce load if necessary
	Voltage drops	Increase cross section of connecting harness
Motor heats up excessively (measure temperature)	Overload	Perform power measurement, use larger motor or reduce load if necessary
	Inadequate cooling	Correct cooling air supply or clear cooling air passages, retrofit forced cooling fan if necessary
	Ambient temperature too high	Adhere to permitted temperature range
	Use delta connection for motor rather than star connection as provided for	Correct circuit
	Loose contact in connecting harness (one phase missing)	Rectify loose contact
	Fuse blown	Look for and rectify cause (see above); replace fuse
	Supply voltage deviates from rated motor voltage by more than 5%. A higher voltage has a particularly unfavorable effect in motors with low-speed winding since in these, the no-load current is already close to the rated current even when the voltage is normal.	Adapt motor to supply voltage
	Rated operating mode (S1 to S10, DIN 57530) exceeded, e.g. due to excessive starting frequency	Adapt rated operating mode of motor to required operating conditions; if necessary call in a specialist to determine what is the correct drive
Excessively loud	Ball bearing compressed, contaminated or damaged	Re-align motor, inspect ball bearing (→ Sec. 'Permitted ball bearing types') and replace if necessary (→ Sec. 'Lubricant table for anti-friction bearings of SEW motors')
	Vibration of rotating parts	Rectify cause, possibly imbalance
	Foreign bodies in cooling air passages	Clean the cooling air passages



7.2 Brake faults

Fault	Possible cause	Remedy
Brake does not release	Incorrect voltage on brake control unit	Apply correct voltage
	Brake control unit failed	Fit a new brake control system, check internal resistance and insulation of brake coil, check switchgear
	Max. permitted working air gap exceeded because brake lining worn down	Measure and set working air gap
	Voltage drop along connecting harness > 10%	Provide for correct connection voltage; check cable cross section
	Inadequate cooling, brake overheats	Replace type BG brake rectifier with type BGE
	Brake coil has interturn fault or short circuit to exposed conductive part	Replace complete brake and brake control system (specialist workshop), check switchgear
Motor does not brake	Working air gap not correct	Measure and set working air gap
	Brake lining worn down	Replace entire brake disk
	Incorrect braking torque	Change the braking torque (→ Sec. 'Technical data') <ul style="list-style-type: none"> by the type and number of brake springs Brake BMG 05: by installing the same brake coil body design as in the BMG 1 brake Brake BMG 2: by installing the same brake coil body design as in the BMG 4 brake
	BM(G) only: Working air gap so large that setting nuts come into contact	Set the working air gap
	BR03, BM(G) only: Manual brake release device not set correctly	Adjust setting nuts
Brake is applied with time lag	Brake is switched on AC voltage side	Switch on DC and AC voltage sides (e.g. BSR); please refer to wiring diagram
Noises in vicinity of brake	Gearing wear caused by jolting startup	Check project planning
	Pulsating torques due to incorrectly set frequency inverter	Check/correct setting of frequency inverter according to operating instructions

7.3 Faults when operating with a frequency inverter



The symptoms described in Sec. 'Motor faults' may also occur when the motor is operated with a frequency inverter. Please refer to the frequency inverter operating instructions for the significance of the problems which occur and to find information about rectifying the problems.

Customer service

Please provide the following information if you require the assistance of our customer service department:

- Nameplate data (complete)
- Nature and extent of the fault
- Time and peripheral circumstances of the fault
- Presumed cause



8 Inspection and Maintenance



- Only use genuine spare parts in accordance with the valid parts list!
- Always replace the brake control system when you replace the brake coil!
- Motors can become very hot during operation – danger of burns!
- Secure hoist drives or lower them (danger of dropping).
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

8.1 Inspection and maintenance periods

Equipment/components	Frequency	What to do
Brake <ul style="list-style-type: none"> • BMG02 • BR03 • BMG05-8 • BM15-62 • BMG61/122 without encoder mounting 	<ul style="list-style-type: none"> • If used as a working brake: At least every 3000 hours of operation¹⁾ 	Inspecting the brake <ul style="list-style-type: none"> • Measure the brake disk thickness • Brake disk, lining • Measure and set working air gap • Pressure plate • Carrier / gearing • Pressure rings
Brake <ul style="list-style-type: none"> • BMG02 • BR03 • BMG05-8 • BM15-62 • BMG61/122 with encoder mounting 	<ul style="list-style-type: none"> • If used as a holding brake: Every 2 to 4 years, depending on operating conditions¹⁾ 	Inspecting the brake <ul style="list-style-type: none"> • Extract the abraded matter • Except for BMG61/122 with encoder mounting: Inspect the switch elements and change if necessary (e.g. in case of burn-out) • Measure the working air gap • BMG61/122 with encoder mounting: Maintenance by SEW-EURODRIVE only!
Motor	<ul style="list-style-type: none"> • Every 10,000 hours of operation 	Inspect the motor: <ul style="list-style-type: none"> • Check ball bearings and replace if necessary • Replace the oil seal • Clean the cooling air passages
Motor with backstop		<ul style="list-style-type: none"> • Change the low-viscosity grease in the backstop
Tacho-generator		<ul style="list-style-type: none"> • Inspection / maintenance according to corresponding operating instructions
Drive	<ul style="list-style-type: none"> • Varies (depending on external factors) 	<ul style="list-style-type: none"> • Touch up or renew the surface/anticorrosion coating

1) The periods of wear are affected by many factors and may be short. The system manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents (e.g. Drive Engineering - Practical Implementation, Vol. 4).

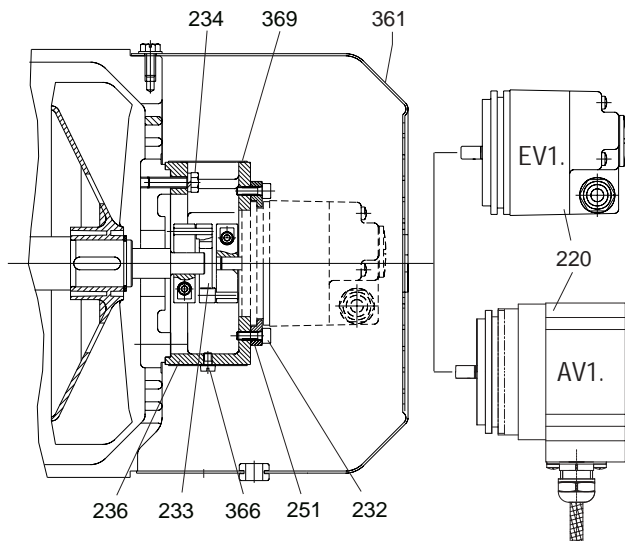


8.2 Preliminary work for motor and brake maintenance



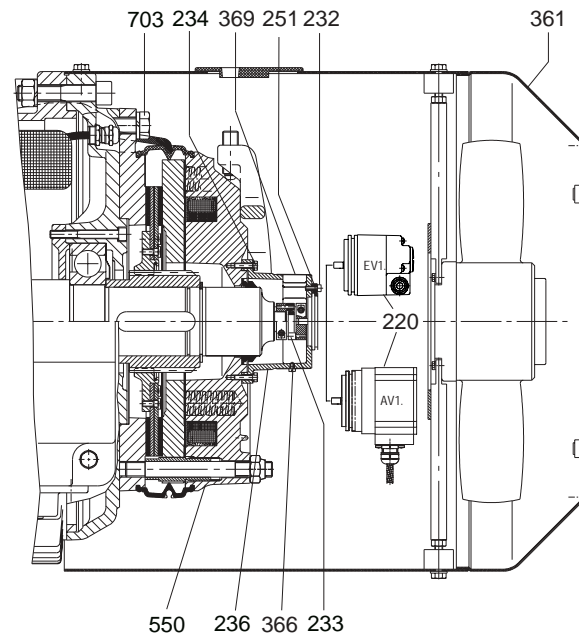
Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

Removing the incremental encoder EV1. / absolute encoder AV1H



51322AXX

Removal of EV1. / AV1H on motors up to size 225



51324AXX

Removal of EV1. / AV1H on motors from size 250 upwards

Key

220 Encoder	236 Intermediate flange	369 Cover plate
232 Machine screw	251 Conical spring washer	550 Brake
233 Coupling	361 Hood cover / fan guard	703 Hex head screw
234 Hex head screw	366 Machine screw	

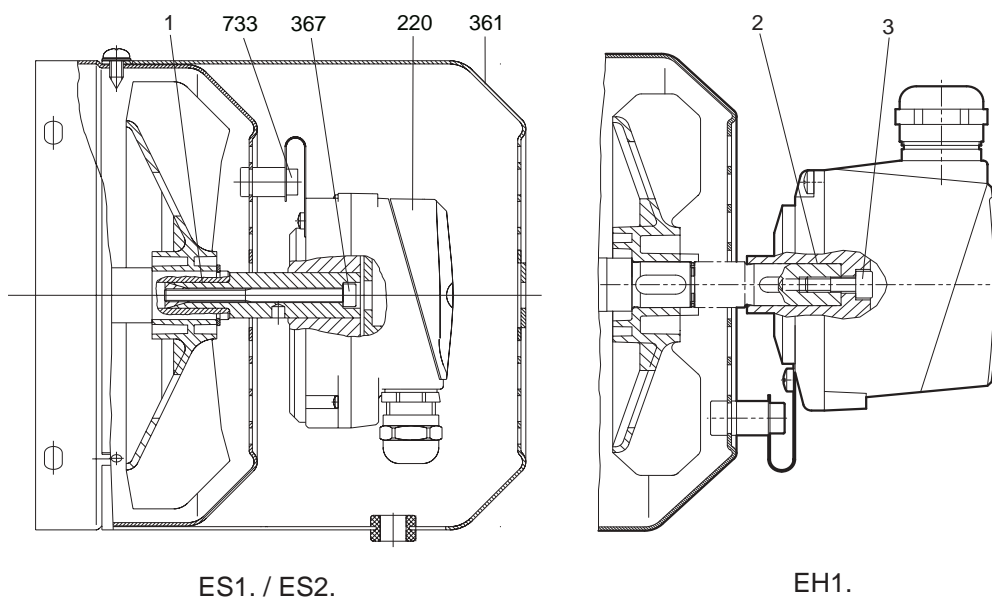
- Remove the hood cover or fan guard (361). If a forced cooling fan is fitted, remove it first.
- Remove the machine screw (366) from the intermediate flange and remove the cover plate (369).
- Unscrew the clamping hub connection of the coupling.
- Loosen machine screws (232) and turn the conical spring washers (251) outwards.
- Remove the encoder (220) together with the coupling (233).
- Lever off the intermediate flange (236) after removing the screws (234).

Note:

During re-assembly, make sure the runout of the shaft end is ≤ 0.05 mm.



Removing the incremental encoder ES1. / ES2.



51341AXX

Key

220 Encoder	361 Hood cover
367 Retaining screw	733 Retaining screw for the torque arm

ES1. / ES2.

- Remove the hood cover (361).
- Loosen the retaining screws (733) for the torque arm.
- Open the screw cover on the back wall of the encoder (220).
- Unscrew the central retaining screw (367) by about 2 – 3 turns and loosen the cone by tapping lightly on the head of the screw. Then unscrew the retaining screw and pull off the encoder.

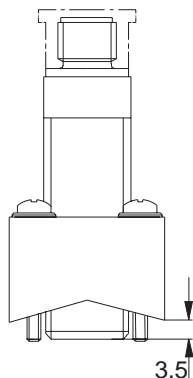
EH1.

- Unscrew the central retaining screws [3] and remove encoder.

Note:

During re-assembly:

- Apply NOCO[®] fluid to the encoder spigot [1] or shaft end [2].
- Tighten the central retaining screw (367) to 2.9 Nm.

***Removing the proximity sensor NV1. / NV2.***

01114CXX

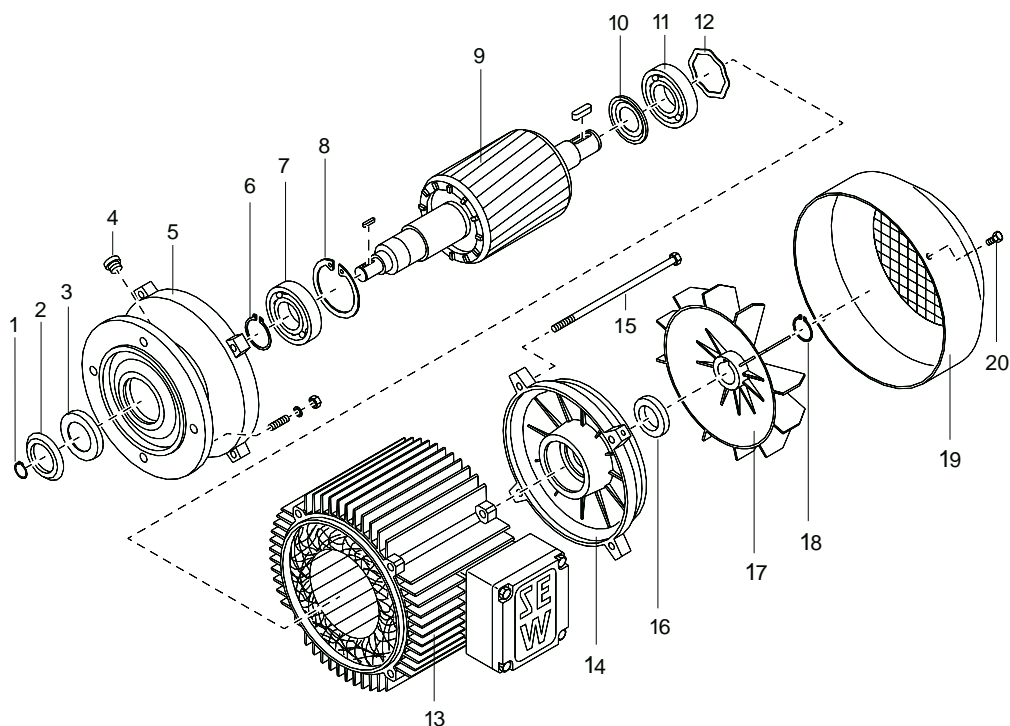
**Important! It is essential for the fan wheel to be at standstill!**

- Disconnect plug
- Pull off the fan guard including NV1. / NV2. Do not tilt it to avoid damaging the proximity switch.
- If the mounting block has been removed from the fan guard or has come loose, it is essential to ensure the following during re-assembly:
The switching surface of the proximity switch must be calibrated to a distance of 3.5 mm from the edge of the prismatic block (→ figure above).



8.3 Inspection and maintenance work on the motor

Example: Motor DFT90



50922AXX

Key

1 Circlip	8 Circlip	15 Hex head screw
2 Oil flinger	9 Rotor	16 V-ring
3 Oil seal	10 Nilos ring	17 Fan
4 Screw plug	11 Ball bearing	18 Circlip
5 Drive end bearing bracket	12 Equalizing ring	19 Fan guard
6 Circlip	13 Stator	20 Housing screw
7 Ball bearing	14 Non drive end bearing bracket	



Sequence



Isolate the motor and brake from the power supply, safeguarding them against unintentional power-up!

1. Remove the forced cooling fan and encoder, if fitted (→ Sec. 'Preliminary work for motor and brake maintenance').
2. Remove the flange cover or fan guard (19) and the fan (17).
3. Remove the hexagon head cap screws (15) from the drive end bearing bracket (5) and the non-drive end bearing bracket (14), release the stator (13) from the drive end bearing bracket.
4. **Motors with brake BM/BMG:**
 - Open the terminal box cover, remove brake cable from the rectifier.
 - Push the non-drive end bearing bracket and the brake off the stator and carefully lift them off (if necessary, run the brake cable along with trailing wire).
 - Pull the stator back by approx. 3 to 4 cm.
5. **Motors with brake BMG02, BR03:**
 - Remove the complete brake with the releasing lever (on units with manual brake release).
6. Visual check: Are there traces of gear oil or condensation inside the stator?
 - If not, continue with 9.
 - If there is condensation, continue with 7.
 - If there is gear oil, have the motor repaired by a specialist workshop.
7. If there is moisture inside the stator:
 - With geared motors: Remove the motor from the gear unit.
 - With motors without a gear unit: Remove the drive end flange.
 - Remove the rotor (9).
8. Clean the winding, dry it and check it electrically (→ Sec. 'Preliminary work').
9. Replace new ball bearings (7, 11) (use authorized ball bearings only → Sec. 'Permitted ball bearing types').
10. Replace oil seal (3) in the drive end bearing bracket.
11. Reseal the stator seat and grease the V-ring or labyrinth seal (DR63).
12. Install the motor, brake etc.
13. Then check the gear unit (→ gear unit operating instructions).

Lubrication of the backstop

The backstop is supplied with Mobil LBZ low-viscosity grease as lubricant and anticorrosion protection. If you want to use a different grease, make sure it complies with NLGI class 00/000, with a base oil viscosity of 42 mm²/s at 40 °C on a lithium saponified and mineral oil base. The application temperature range is from -50 °C to +90 °C. See the following table for the amount of grease required.

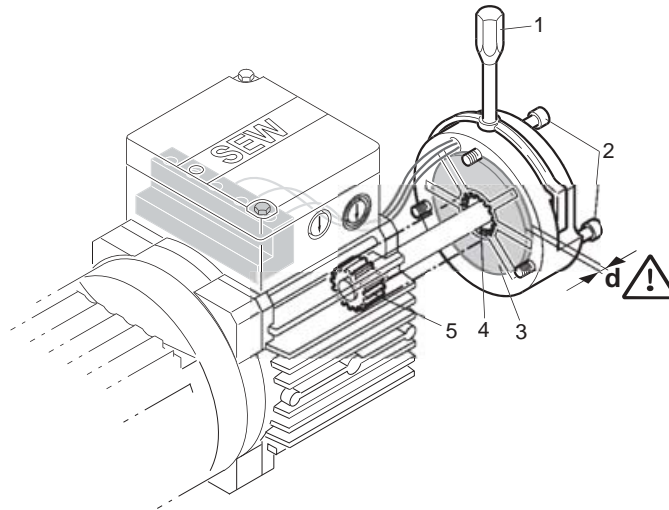
Motor type	71/80	90/100	112/132S	132M-160M	160L...225	250/280
Grease [g]	9	15	15	20	45	80



8.4 Inspection and maintenance of the brake BMG02

Measure the brake disk thickness, replace brake BMG02

The status of the brake disk is determined by measuring the brake disk thickness. Replace the brake BMG02 when the brake disk thickness reaches the minimum value (→ figure below). It is not possible to adjust the working air gap.



50345AXX



1. **Isolate the motor and brake from the power supply, safeguarding them against unintentional power-up!**
2. Remove the hand lever (1, on units with manual brake release). Remove the fan guard and the fan.
3. Loosen the screws (2) and remove the complete brake with the releasing lever (on units with manual brake release)
4. Measure the thickness 'd' of the brake disk (3):

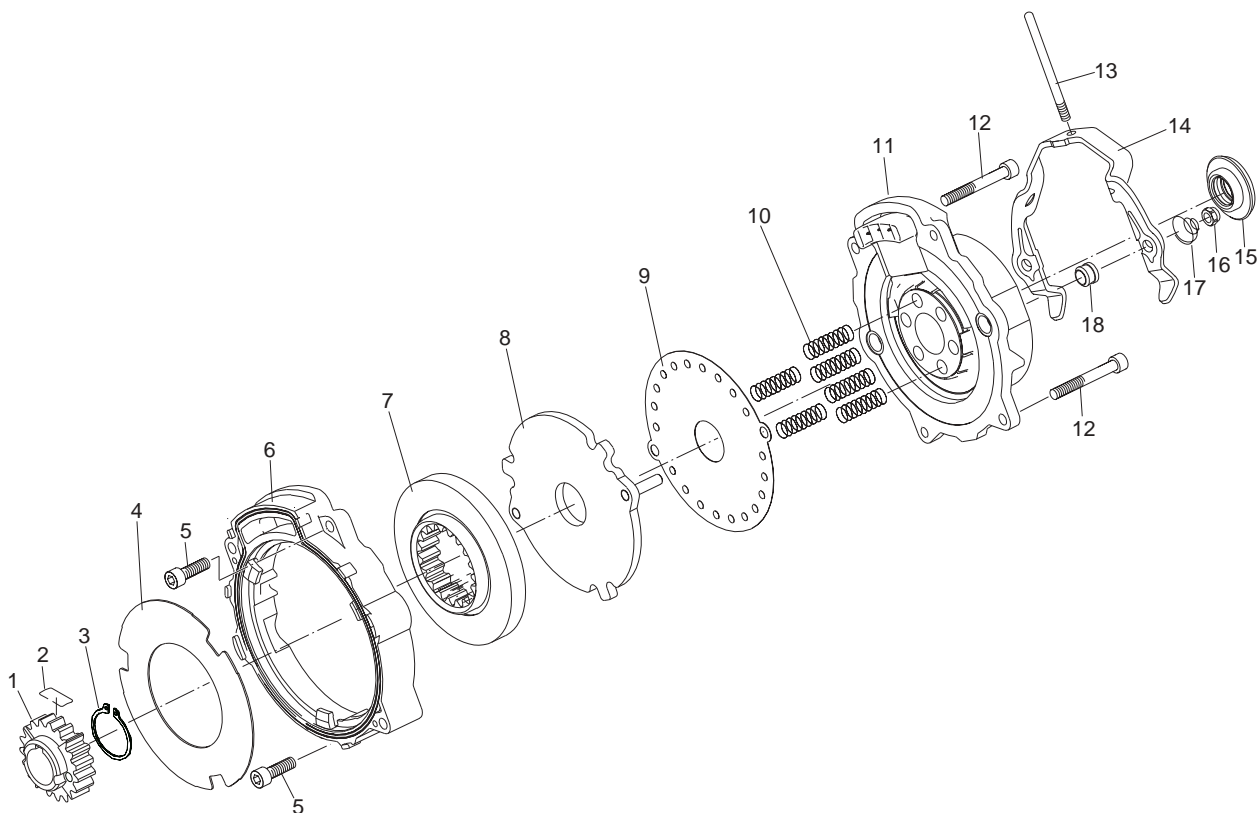
Brake Type	Thickness 'd' of the brake disk [mm]		Max. braking torque [Nm]
	max.	min.	
BMG02	6	5.4	0.8
		5.6	1.2



5. **Replace the complete brake when the brake disk thickness has reached the minimum value.**
6. Mount the complete brake on the motor:
 - Make sure that the gearing of the brake disk (4) engages in the gearing of the carrier (5).
 - Route the electric brake leads through the non drive-end bearing bracket and the inside of the motor into the terminal box.
7. Use bolts (2) to fit the brake back onto the non drive-end bearing bracket.
8. Re-install the fan, fan guard and hand lever (1) (on units with manual brake release).



8.5 Inspection and maintenance of the brake BR03



50067AXX

Key

1 Carrier	7 Brake disk	13 Hand lever
2 Clip	8 Pressure plate with stud	14 Releasing lever
3 Circlip	9 Damping plate	15 Sealing washer
4 Friction plate	10 Brake springs	16 Lock nut
5 Bolt	11 Brake coil body	17 Conical coil spring
6 Guide ring	12 Bolt	18 Sealing element

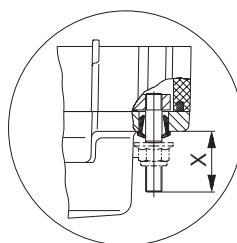


Inspecting brake BR03, measure the working air gap



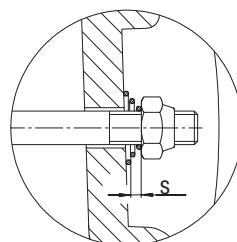
The working air gap cannot be adjusted and can only be measured by means of the stroke of the pressure plate when the brake is released.

1. **Isolate the motor and brake from the power supply, safeguarding them against unintentional power-up!**
2. Remove the hand lever (13, on units with manual brake release). Remove the fan guard and the fan.
3. Remove the lock nuts (16) and, if manual brake release is fitted, remove the conical coil springs (17) and the releasing lever (14).
4. Measure clearance x (→ following figure) with the brake at rest:



50066AXX

- From the end of the stud on the pressure plate (8) to the brake coil body (11).
5. Release the brake electrically.
 6. Measure clearance x with the brake released:
 - From the end of the stud on the pressure plate (8) to the brake coil body (11).
 7. The differential corresponds to the working air gap, i.e. the stroke of the pressure plate (18):
 - If the working air gap ≤ 0.8 mm, reinstall the conical coil springs (17), releasing lever (14) and lock nuts (16).
 - If the working air gap ≥ 0.8 mm, replace the entire brake.
 - Use setting nuts to set the floating clearance 's' between the conical coil springs (pressed flat) and the setting nuts (→ following figure).



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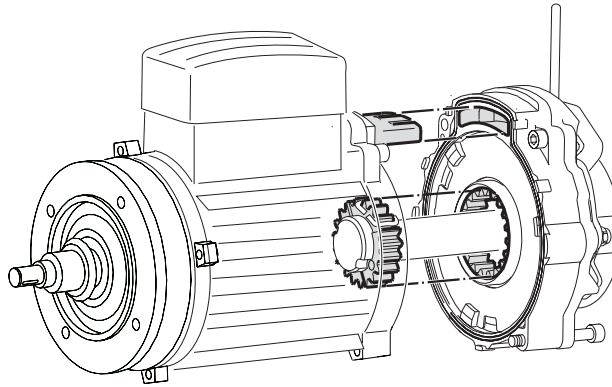
Brake	Floating clearance s [mm]
BR03	2



Important: The floating clearance 's' is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.



8. Reassemble the removed parts. Connect the new brake (replaced if the working air gap ≥ 0.8 mm) to the motor (\rightarrow following figure):
 - Make sure the gearing of the brake disk engages in the gearing of the carrier and that the plug on the motor end fits into the socket on the brake end.



50175AXX

Altering the braking torque BR03

The braking torque can be changed in steps (\rightarrow Sec. 'Work done, working air gap, braking torques of brake BR03, BMG05-8')

- by installing different brake springs.
- by changing the number of brake springs.



1. **Isolate the motor and brake from the power supply, safeguarding them against unintentional power-up!**
2. Remove the hand lever (13, on units with manual brake release). Remove the fan guard and the fan.
3. Loosen the bolts (12) and remove the complete brake with the releasing lever (on units with manual brake release).
4. Loosen the screws (5) and remove the guide ring (6) with friction plate (4), brake disk (7), pressure plate (8) and damping plate (9).
5. Remove the brake springs (10) from the brake coil body (11) and replace them by new ones.
6. Position the new brake springs symmetrically.
7. Slide the damping plate (9) over two studs attached to the pressure plate (8) so the embossing pattern is located with the projecting side facing the pressure plate.
8. Pressure plate (8):
 - Place on the brake springs (10) together with the damping plate (9).
 - Guide the studs attached to the pressure plate (8) through the holes in the brake coil body (6) and make sure the pressure plate is in the correct position.
9. Place the flat side of the brake disk (7) on the pressure plate (8).

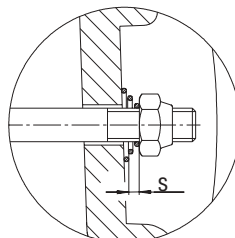
Note: Do not bring the disk into contact with grease or oil!
10. Place the guide ring (6) and friction disk (4) onto the brake disk (7), press down and install the screws (5).





11. Units with manual brake release:

- Put on the conical coil springs (17) and releasing lever (14), install the lock nuts (16).
- With manual brake release: Use setting nuts to set the floating clearance 's' between the conical coil springs (pressed flat) and the setting nuts (→ following figure).



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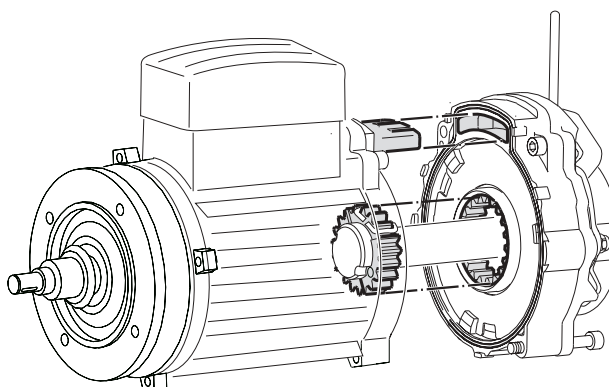
Brake	Floating clearance s [mm]
BR03	2



Important: The floating clearance 's' is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

12. Connect the complete brake back onto the motor (→ following figure):

- Make sure the gearing of the brake disk engages in the gearing of the carrier and that the plug on the motor end fits into the socket on the brake end.



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13. Re-install the fan, fan guard and hand lever (10) (on units with manual brake release).

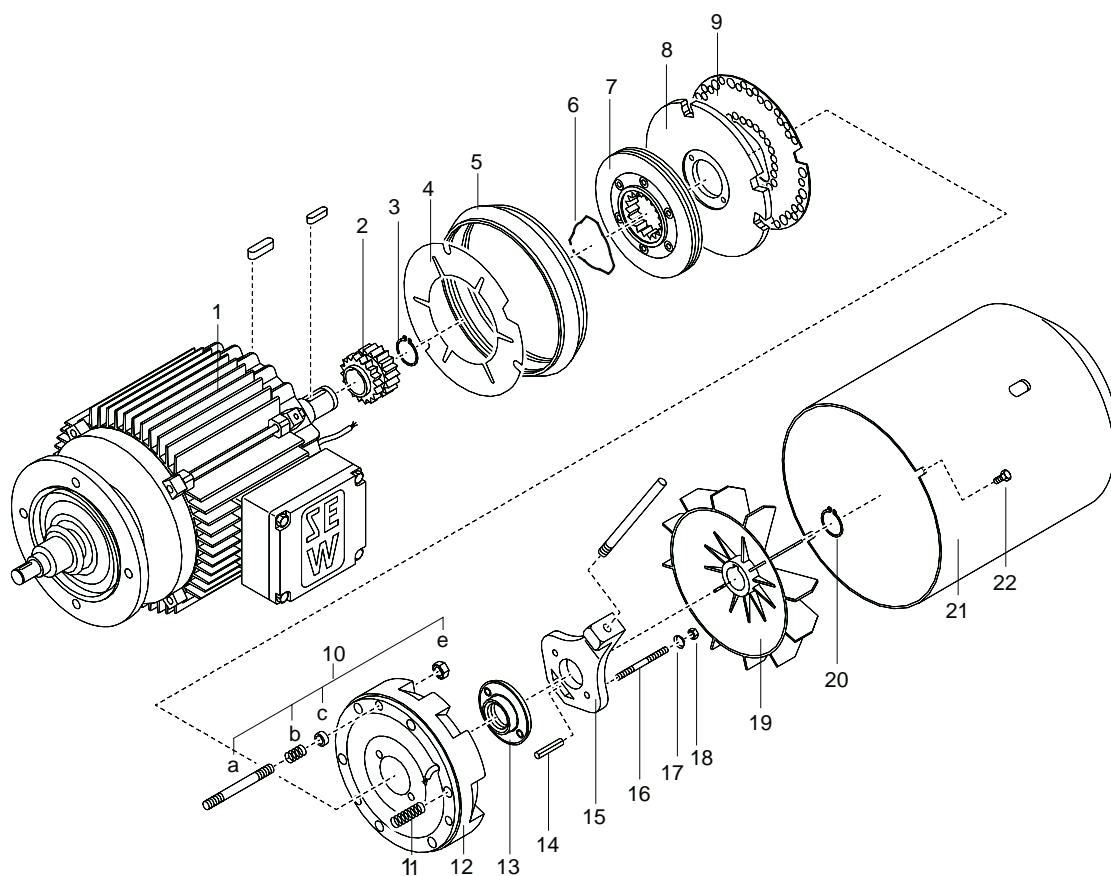


8.6 Inspection and maintenance of the brakes BM15-62, BMG05-122



Brakes BMG61 / BMG122 with encoder mounting are only used as holding brakes.
Maintenance work by SEW-EURODRIVE only.

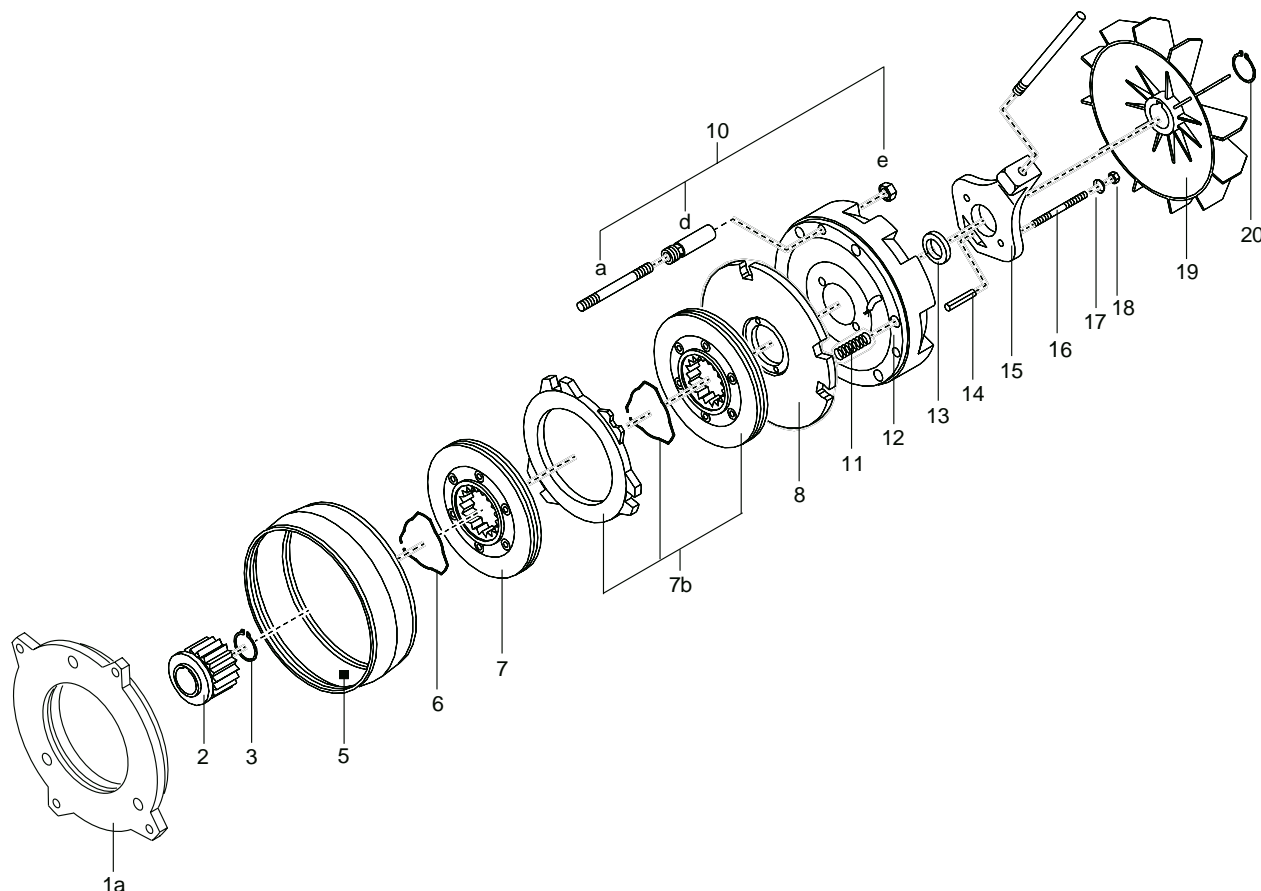
Brake BM(G)05-15



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Brakes BM30-62, BMG61/122



50920AXX

Key

- | | | |
|---|----------------------------------|----------------------------------|
| 1 Motor with brake bearing bracket | 8 Pressure plate | 14 Dowel pin |
| 1a BMG61/122 only:
Intermediate flange | 9 Damping plate (BMG only) | 15 Release lever with hand lever |
| 2 Carrier | 10a Stud (3 pcs.) | 16 Stud (2 pcs.) |
| 3 Circlip | 10b Counter spring | 17 Conical coil spring |
| 4 Niro disk (BMG only) | 10c Pressure ring | 18 Setting nut |
| 5 Rubber sealing collar | 10d Setting sleeve | 19 Fan |
| 6 Annular spring | 10e Hex nut | 20 Circlip |
| 7 Brake disk | 11 Brake spring | 21 Fan guard |
| 7b BM 32, 62 only:
Brake stationary disk, annular
spring,
Brake disk | 12 Brake coil body | 22 Housing screw |
| | 13 In BMG: Seal
In BM: V-ring | |



Setting the working air gap in brakes BMG05-8 / BM15-62 / BMG61/122 without encoder mounting



1. **Isolate the motor and brake from the power supply, safeguarding them against unintentional power-up!**
2. Remove the following:
 - If installed, forced cooling fan, tacho/encoder (→ Sec. 'Preliminary work for motor and brake maintenance').
 - Flange cover or fan guard (21).
3. Push the rubber sealing collar (5) aside:
 - Release the clip to do this, if necessary.
 - Extract the abraded matter.
4. Measure the brake disk (7, 7b):

If the brake disk is

 - ≤ 9 mm on brake motors up to size 100
 - ≤ 10 mm on brake motors up to size 112
 - ≤ 12 mm on brake motors up to size 250

replace the brake disk (→ Sec. 'Changing the brake disk BMG 05-8, BM 15-62').
5. **In BM30-62 / BMG61/122 without encoder mounting:**

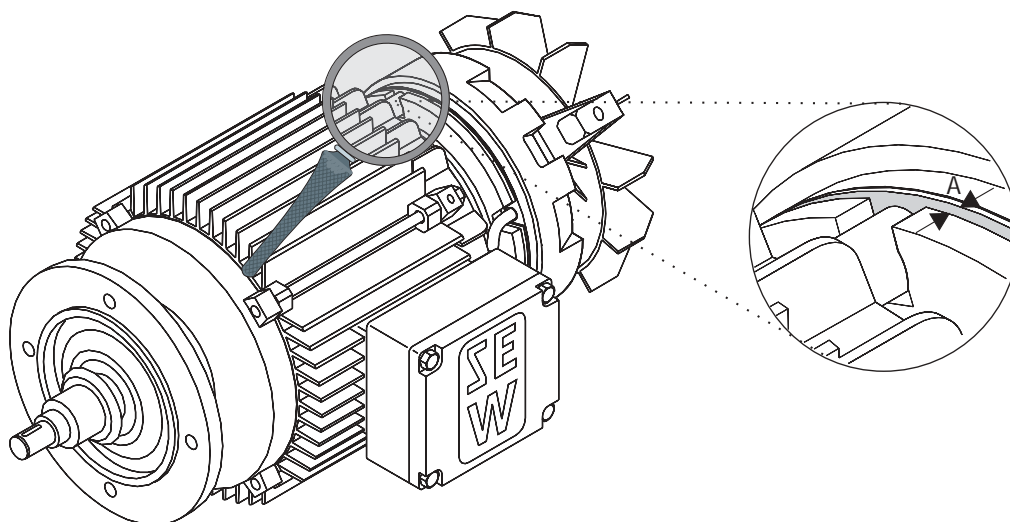
Loosen the setting sleeve (10d) by turning it towards the bearing bracket.
6. Measure the working air gap A (→ following figure)

(use a feeler gauge and measure at three points offset by 120°)

 - In BM, between the pressure plate (8) and the brake coil body (12).
 - With BMG, between the pressure plate (8) and the damping plate (9).
7. Tighten the hex nuts (10e)
 - until the working air gap is set correctly (→ Sec. 'Technical data').
 - in BM 30-62, until the working air gap is initially 0.25 mm.
8. **In BM30-62 / BMG61/122 without encoder mounting:**

Tighten the setting sleeves

 - against the brake coil body.
 - until the working air gap is set correctly (→ Sec. 'Technical Data').
9. Fit the rubber sealing collar back in place and re-install the removed parts.



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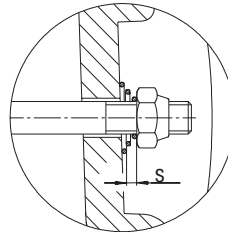


Fitting a new brake disk in brakes BMG05-8 / BM15-62 / BMG61/122 without encoder mounting

When fitting a new brake disk (in BMG05-4 ≤ 9 mm; in BMG62 ≤ 10 mm; in BMG61/122 ≤ 12 mm) inspect the other removed parts as well and fit new ones if necessary.



1. **Isolate the motor and brake from the power supply, safeguarding them against unintentional power-up!**
2. Remove the following:
 - If installed, forced cooling fan, tacho/encoder (\rightarrow Sec. 'Preliminary work for motor and brake maintenance').
 - Flange cover or fan guard (21), circlip (20) and fan (19).
3. Remove the rubber sealing collar (5) and the manual brake release:
 - Setting nuts (18), conical coil springs (17), studs (16), release lever (15), dowel pin (14).
4. Loosen hex nuts (10e), carefully pull off the brake coil body (12) (brake cable!) and take out the brake springs (11).
5. Remove the damping cable (9), pressure plate (8) and brake disk (7, 7b) and clean the brake components.
6. Install new brake disk.
7. Re-install the brake components
 - except for the rubber sealing collar, fan and fan guard, set the working air gap (\rightarrow Sec. 'Inspecting brake BMG 05-8, BM 30-62, setting the working air gap', points 5 to 8).
8. With manual brake release: Use setting nuts to set the floating clearance 's' between the conical coil springs (pressed flat) and the setting nuts (\rightarrow following figure).



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Brake	Floating clearance s [mm]
BMG05-1	1.5
BM15-62, BMG2-8, BMG61/122	2



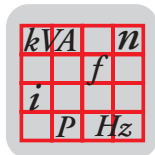
Notes

Important: This floating clearance 's' is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

9. Re-install the rubber sealing collar and the removed parts
 - The lockable manual brake release (type HF) is already released if a resistance is encountered when operating the grub screw.
 - The self-reengaging manual brake release (type HR) can be operated with normal hand pressure.



Important: In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup/maintenance! A bracket is provided for storing it on the outside of the motor.



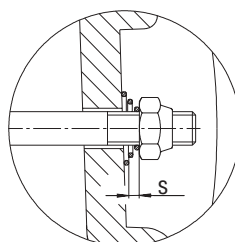
Changing the braking torque of BMG05-122, BM15-62

The braking torque can be changed in steps (→ Sec. 'Technical data')

- by installing different brake springs.
- by changing the number of brake springs.
- by changing the brake coil body:
 - **BMG05:** if the maximum braking torque is not sufficient for the specific application, install the brake coil body (12) of brake BMG1 of the same design in order to ensure safe braking
 - **BMG2:** if the maximum braking torque is not sufficient for the specific application, install the brake coil body (12) of brake BMG4 of the same design in order to ensure safe braking



1. **Isolate the motor and brake from the power supply, safeguarding them against unintentional power-up**
2. Remove the following:
 - If installed, forced cooling fan, tacho/encoder (→ Sec. 'Preliminary work for motor and brake maintenance')
 - Flange cover or fan guard (21), circlip (20) and fan (19)
3. Remove the rubber sealing collar (5) and the manual brake release:
 - Setting nuts (18), conical coil springs (17), studs (16), release lever (15), dowel pin (14).
4. Loosen hex nuts (10e), pull off the coil body (12)
 - by approx. 50 mm (watch the brake cable!).
5. Change or add brake springs (11)
 - Position the brake springs symmetrically.
6. Re-install the brake components
 - except for the rubber sealing collar, fan and fan guard. Set the working air gap (→ Sec. 'Setting the working air gap', points 5 to 8).
7. With manual brake release: Use setting nuts to set the floating clearance 's' between the conical coil springs (pressed flat) and the setting nuts (→ following figure)



01111BXX

Brake	Floating clearance s [mm]
BMG05-1	1.5
BMG2-8, BMG61/122, BM15-62	2

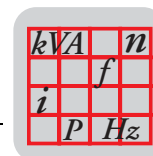


Note

Important: This floating clearance 's' is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

8. Re-install the rubber sealing collar and the removed parts.

Replace setting nuts (18) and hexagon nuts (10e) if the removal procedure is repeated!



9 Technical Data

9.1 Work done, braking torques BMG02

Brake type	For motor size	Work done until maintenance [10 ⁶ J]	Thickness of the brake disk [mm]		Braking torque [Nm]
			max.	min.	
BMG02	DT56 ET56	30	6	5.6 5.4	1.2 0.8

9.2 Information for ordering a replacement BMG02

Brake type	Voltage	Braking torque	Brake part number
	[V _{DC}]	[Nm]	
BMG02	24	0.8	0574 319 2
		1.2	0574 323 0
BMG02/HR	24	0.8	0574 327 3
		1.2	0574 331 1

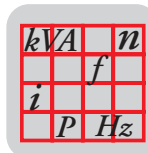
Brake type	Voltage	Braking torque	Brake part number
	[V _{AC}]	[Nm]	
BMG02	230	0.8	0574 320 6
		1.2	0574 324 9
	400	0.8	0574 321 4
		1.2	0574 325 7
	460/500	0.8	0574 322 2
		1.2	0574 326 5
BMG02/HR	230	0.8	0574 328 1
		1.2	0574 332 X
	400	0.8	0574 329 X
		1.2	0574 333 8
	460/500	0.8	0574 330 3
		1.2	0574 334 6



9.3 Work done, working air gap, braking torques BR03, BMG05-8

Brake type	for Motor size	Work done until maintenance [10 ⁶ J]	Working air gap [mm]		Braking torque [Nm]	Braking torque settings Type and no. of springs		Order number of springs	
			min. ¹⁾	max.		Normal	Red	Normal	Red
BR03	63	200	-	0.8	3.2 2.4 1.6 0.8	6 4 3 -	- 2 - 6	185 815 7	185 873 4
BMG05 ²⁾	71	120	0.25	0.6	5.0 4.0 2.5 1.6 1.2	3 2 - - -	- 2 6 4 3	135 017 X	135 018 X
BMG1	80	120			10 7.5 6.0	6 4 3	- 2 3		
BMG2 ³⁾	90 100	260			20 16 10 6.6 5.0	3 2 - - -	- 2 6 4 3	135 150 8	135 151 6
BMG4	100	260			40 30 24	6 4 3	- 2 3		
BMG8	112M 132S	600	0.3	1.2	75 55 45 37 30 19 12.6 9.5	6 4 3 3 2 - - -	- 2 3 - 2 6 4 3	184 845 3	135 570 8

- 1) Please note when checking the working air gap: Parallelism tolerances on the brake disk may give rise to deviations of ± 0.15 mm after a test run.
- 2) BMG05: If the maximum braking torque (5 Nm) is not sufficient, it is possible to install the brake coil body of the BMG1 brake.
- 3) BMG2: If the maximum braking torque (20 Nm) is not sufficient, it is possible to install the brake coil body of the BMG4 brake.

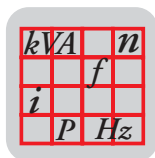


9.4 Work done, working air gap, braking torques BM15 - 62, BMG61/122

Brake type	for Motor size	Work done until maintenance [10 ⁶ J]	Working air gap [mm]		Braking torque [Nm]	Braking torque settings Type and no. of springs		Order number of springs	
			min. ¹⁾	max.		Normal	Red	Normal	Red
BM15	132M, ML 160M	1000	0.3	1.2	150	6	-	184 486 5	184 487 3
					125	4	2		
					100	3	3		
					75	3	-		
					50	-	6		
					35	-	4		
BM30	160L 180	1500	0.3	1.2	25	-	3	136 998 9	136 999 7
					300	8	-		
					250	6	2		
					200	4	4		
					150	4	-		
					125	2	4		
BM31	200 225	1500	0.3	1.2	100	-	8	136 998 9	136 999 7
					75	-	6		
					50	-	4		
					300	4	-		
					250	2	4		
					200	-	8		
BM32 ²⁾	180	1500	0.4	1.2	150	-	6	136 998 9	136 999 7
					100	-	4		
					600	8	-		
					500	6	2		
					400	4	4		
					300	4	-		
BM62 ²⁾	200 225	1500	0.4	1.2	250	2	4	186 838 1	186 839 X
					200	-	8		
					150	-	6		
					100	-	4		
					600	8	-		
					500	6	2		
BMG61	250 280	2500	0.3	1.2	400	4	4	186 838 1	186 839 X
					300	4	-		
					200	-	8		
					1200	8	-		
					1000	6	2		
					800	4	4		
BMG122 ²⁾			0.4	1.2	600	4	-	186 838 1	186 839 X
					400	-	8		

1) Please note when checking the working air gap: Parallelism tolerances on the brake disk may give rise to deviations of ± 0.15 mm after a test run.

2) Double disk brake



9.5 Operating currents

The current values I_H (holding current) specified in the tables are r.m.s. values. Use only r.m.s. instruments for your measurement. The inrush current (accelerator current) I_B only flows for a short time (max. 120 ms) when the brake is released or during voltage dips below 70 % of rated voltage. There is no increased inrush current if the BG brake rectifier is used or if there is a direct DC voltage supply – both are possible with brakes up to size BMG4 only.

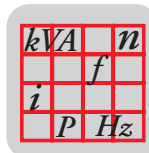
BMG02, BR03 brake

	BMG02	BR03
Motor size	56	63
Max. braking torque [Nm]	1.2	3.2
Braking power [W]	25	25
Inrush current ratio I_B/I_H	-	4

Rated voltage V_N		BMG02		BR03	
V_{AC}	V_{DC}	I_H [A _{AC}]	I_G [A _{DC}]	I_H [A _{AC}]	I_G [A _{DC}]
	24	-	0.72	-	0.72
24 (23-26)	10	-	-	1.5	1.80
42 (40-45)	18	-	-	0.81	1.01
48 (46-50)	20	-	-	0.72	0.90
53 (51-56)	22	-	-	0.64	0.80
60 (57-63)	24	-	-	0.57	0.72
67 (64-70)	27	-	-	0.50	0.64
73 (71-78)	30	-	-	0.45	0.57
85 (79-87)	36	-	-	0.40	0.51
92 (88-98)	40	-	-	0.35	0.45
110 (99-110)	44	-	-	0.31	0.40
120 (111-123)	48	-	-	0.28	0.36
133 (124-138)	54	-	-	0.25	0.32
147 (139-154)	60	-	-	0.22	0.29
160 (155-173)	68	-	-	0.20	0.25
184 (174-193)	75	-	-	0.17	0.23
208 (194-217)	85	-	-	0.16	0.20
230 (218-243)	96	0.14	0.18	0.14	0.18
254 (244-273)	110	-	-	0.12	0.16
290 (274-306)	125	-	-	0.11	0.14
318 (307-343)	140	-	-	0.10	0.13
360 (344-379)	150	-	-	0.09	0.11
400 (380-431)	170	0.08	0.10	0.08	0.10
460 (432-500)	190	0.07	0.09	0.07	0.09

Key

- I_B Accelerator current – brief inrush current
- I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier
- I_G Direct current with direct DC voltage supply with rated voltage V_N
- V_N Rated voltage (rated voltage range)



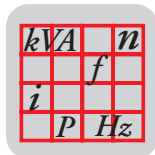
Brake BMG 05 - BMG 4

	BMG05	BMG1	BMG2	BMG4
Motor size	71/80	80	90/100	100
Max. braking torque [Nm]	5	10	20	40
Braking power [W]	32	36	40	50
Inrush current ratio I_B/I_H	4	4	4	4

Rated voltage V_N		BMG05		BMG 1		BMG 2		BMG 4	
V_{AC}	V_{DC}	I_H [A _{AC}]	I_G [A _{DC}]	I_H [A _{AC}]	I_G [A _{DC}]	I_H [A _{AC}]	I_G [A _{DC}]	I_H [A _{AC}]	I_G [A _{DC}]
	24		1.38		1.54		1.77		2.20
24 (23-25)	10	2.0	3.3	2.4	3.7	-	-	-	-
42 (40-46)	18	1.14	1.74	1.37	1.94	1.46	2.25	1.80	2.80
48 (47-52)	20	1.02	1.55	1.22	1.73	1.30	2.00	1.60	2.50
56 (53-58)	24	0.90	1.38	1.09	1.54	1.16	1.77	1.43	2.20
60 (59-66)	27	0.81	1.23	0.97	1.37	1.03	1.58	1.27	2.00
73 (67-73)	30	0.72	1.10	0.86	1.23	0.92	1.41	1.14	1.76
77 (74-82)	33	0.64	0.98	0.77	1.09	0.82	1.25	1.00	1.57
88 (83-92)	36	0.57	0.87	0.69	0.97	0.73	1.12	0.90	1.40
97 (93-104)	40	0.51	0.78	0.61	0.87	0.65	1.00	0.80	1.25
110 (105-116)	48	0.45	0.69	0.54	0.77	0.58	0.90	0.72	1.11
125 (117-131)	52	0.40	0.62	0.48	0.69	0.52	0.80	0.64	1.00
139 (132-147)	60	0.36	0.55	0.43	0.61	0.46	0.70	0.57	0.88
153 (148-164)	66	0.32	0.49	0.39	0.55	0.41	0.63	0.51	0.79
175 (165-185)	72	0.29	0.44	0.34	0.49	0.37	0.56	0.45	0.70
200 (186-207)	80	0.26	0.39	0.31	0.43	0.33	0.50	0.40	0.62
230 (208-233)	96	0.23	0.35	0.27	0.39	0.29	0.44	0.36	0.56
240 (234-261)	110	0.20	0.31	0.24	0.35	0.26	0.40	0.32	0.50
290 (262-293)	117	0.18	0.28	0.22	0.31	0.23	0.35	0.29	0.44
318 (294-329)	125	0.16	0.25	0.19	0.27	0.21	0.31	0.25	0.39
346 (330-369)	147	0.14	0.22	0.17	0.24	0.18	0.28	0.23	0.35
400 (370-414)	167	0.13	0.20	0.15	0.22	0.16	0.25	0.20	0.31
440 (415-464)	185	0.11	0.17	0.14	0.19	0.15	0.22	0.18	0.28
500 (465-522)	208	0.10	0.15	0.12	0.17	0.13	0.20	0.16	0.25

Key

- I_B Accelerator current – brief inrush current
- I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier
- I_G Direct current with direct DC voltage supply
- V_N Rated voltage (rated voltage range)


**Brake BMG 8 -
BM 32/62**

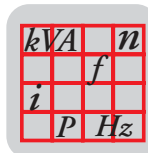
	BMG8	BM 15	BM30/31; BM32/62
Motor size	112/132S	132M-160M	160L-225
Max. braking torque [Nm]	75	150	600
Braking power [W]	65	95	130
Inrush current ratio I_B/I_H	6.3	7.5	8.5

Rated voltage V_N		BMG8	BM 15	BM 30/31; BM 32/62
V_{AC}	V_{DC}	I_H [A _{AC}]	I_H [A _{AC}]	I_H [A _{AC}]
	24	2.77 ¹⁾	4.15 ¹⁾	5.00 ¹⁾
42 (40-46)	-	2.31	3.35	-
48 (47-52)	-	2.10	2-95	-
56 (53-58)	-	1.84	2.65	-
60 (59-66)	-	1.64	2.35	-
73 (67-73)	-	1.46	2.10	-
77 (74-82)	-	1.30	1.87	-
88 (83-92)	-	1.16	1.67	-
97 (93-104)	-	1.04	1.49	-
110 (105-116)	-	0.93	1.32	1.78
125 (117-131)	-	0.82	1.18	1.60
139 (132-147)	-	0.73	1.05	1.43
153 (148-164)	-	0.66	0.94	1.27
175 (165-185)	-	0.59	0.84	1.13
200 (186-207)	-	0.52	0.74	1.00
230 (208-233)	-	0.46	0.66	0.90
240 (234-261)	-	0.41	0.59	0.80
290 (262-293)	-	0.36	0.53	0.71
318 (294-329)	-	0.33	0.47	0.63
346 (330-369)	-	0.29	0.42	0.57
400 (370-414)	-	0.26	0.37	0.50
440 (415-464)	-	0.24	0.33	0.44
500 (465-522)	-	0.20	0.30	0.40

1) Direct current in BSG operation

Key

- I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier
- I_B Accelerator current – brief inrush current
- I_G Direct current with direct DC voltage supply
- V_N Rated voltage (rated voltage range)

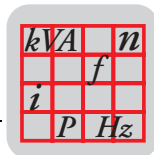

BMG61, BMG122
brake

	BMG61	BMG122
Motor size	250M...280S	
Max. braking torque [Nm]	600	1200
Braking power [W]	200	
Inrush current ratio I_B/I_H	6	

Rated voltage V_N V_{AC}	BMG61/122 I_H [A _{AC}]
208 (194-217)	1.50
230 (218-243)	1.35
254 (244-273)	1.20
290 (274-306)	1.10
318 (307-343)	1.00
360 (344-379)	0.85
400 (380-431)	0.75
460 (432-484)	0.65
500 (485-500)	0.60

Key

- I_B Accelerator current – brief inrush current
 I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier
 V_N Rated voltage (rated voltage range)



9.6 Permitted ball bearing types

Motor type	Driving end A bearing (AC motor, brake motor)			Non-driving end B bearing (Foot/flange-mounted, gearmotors)	
	Flange-mounted motor	Gearmotor	Foot-mounted motor	AC motor	Brake motor
DT56	-	6302-Z-J	-	6001-2RS-J	6001-2RS-J
DFR63	6203-Z-J	6303-Z-J	-	6202-2C-J	6202-2RS-J-C3
DT71-DT80	6204-Z-J	6303-Z-J	6204-Z-J	6203-J	6203-RS-J-C3
DT(E)90 - DV(E)100		6306-Z-J		6205-J-2Z	6205-RS-J-C3
DV(E)112 - 132S	6208-Z-J	6307-Z-J	6208-Z-J	6207-J-2Z	6207-RS-J-C3
DV(E)132M - 160M		6309-Z-J-C3		6209-2Z-J-C3	
DV(E)160L - 180L		6312-Z-J-C3		6213-2Z-J-C3	
DV(E)200 - 225		6314-Z-J-C3		6314-Z-J-C3	
DV250 - 280		6316-Z-J-C3		6315-Z-J-C3	

9.7 Lubricant table for anti-friction bearings of SEW motors



The motor anti-friction bearings are factory-filled with the greases listed below. SEW-EURODRIVE recommends filling one third of the cavities between the rolling elements with grease when regreasing.

The bearings with the lubricants from Klüber are designed as sealed bearings 2Z or 2RS..

	Ambient temperature	Manufacturer	Type
Anti-friction bearing in motor	-25 °C ... +80 °C	Esso	Unirex EQ3 ¹⁾
	+80 °C ... +100 °C	Klüber	Barrierta L55/2 ²⁾
	-45 °C ... +60 °C	Klüber	Asonic GHYF2 ²⁾

1) Mineral lubricant (= mineral-based anti-friction bearing grease)

2) Synthetic lubricant (= synthetic anti-friction bearing grease)

10 Revision Status

The following additions and changes have been made to the previous edition of the AC Motors operating instructions (publication number: 1055 3517, edition 10/2002):

- | | |
|--|--|
| General | <ul style="list-style-type: none">• The energy saving motors DTE / DVE and encoder EH1. have been added to the operating instructions. |
| Electrical Installation section | <ul style="list-style-type: none">• The energy saving motor information has been added in the table "Encoder overview." |
| Startup section | <ul style="list-style-type: none">• The energy saving motors information has been added to the table in the paragraph "Altering the block direction on motors with backstop." |
| Inspection/ Maintenance section | <ul style="list-style-type: none">• The paragraphs "Preliminary work for motor and brake maintenance" and "Removing the incremental encoders ES1. / ES2. / EH1." have been revised.• The table "Lubrication of the backstop" now includes motor type 250/280. |
| Technical Data section | <ul style="list-style-type: none">• The table "Permitted ball bearing types" has been revised. |



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Australia			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 (0) 3 99 33 10 00 Fax +61 (0) 3 99 33 10 03 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 (0) 2 97 25 99 00 Fax +61 (0) 2 97 25 99 05 enquires@sew-eurodrive.com.au



Address List

Austria			
Assembly Sales Service	Wien	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 (0) 16 17 55 00-0 Fax +43 (0) 16 17 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at
Belgium			
Assembly Sales Service	Brüssel	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 (0) 10 23 13 11 Fax +32 (0) 10 2313 36 http://www.caron-vector.be info@caron-vector.be
Brazil			
Production Sales Service	Sao Paulo	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 (0) 11 64 89 91 33 Fax +55 (0) 11 64 80 33 28 http://www.sew.com.br sew@sew.com.br
Additional addresses for service in Brazil provided on request!			
Bulgaria			
Sales	Sofia	BEVER-DRIVE GMBH Bogdanovetz Str. 1 BG-1606 Sofia	Tel. +359 (0) 9 29 53 25 65 Fax +359 (0) 9 29 54 93 45 bever@mbox.infotel.bg
Cameroon			
Sales	Douala	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 (0) 43 22 99 Fax +237 (0) 42 77 03
Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 (0) 905 7 91-15 53 Fax +1 (0) 905 7 91-29 99 http://www.sew-eurodrive.ca l.reynolds@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 (0) 604 9 46-55 35 Fax +1 (0) 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 (0) 514 3 67-11 24 Fax +1 (0) 514 3 67-36 77 a.peluso@sew-eurodrive.ca
Additional addresses for service in Canada provided on request!			
Chile			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMP RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 (0) 27 57 70 00 Fax +56 (0) 27 57 70 01 sewsales@entelchile.net
China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 (0) 22 25 32 26 12 Fax +86 (0) 22 25 32 26 11 http://www.sew.com.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 (0) 5 12 - 62 58 17 81 Fax +86 (0) 5 12 - 62 58 17 83 suzhou@sew.com.cn



Colombia			
Assembly Sales Service	Bogotá	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 (0) 15 47 50 50 Fax +57 (0) 15 47 50 44 sewcol@andinet.com
Croatia			
Sales Service	Zagreb	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 (0) 14 61 31 58 Fax +385 (0) 14 61 31 58 kompeks@net.hr
Czech Republic			
Sales	Praha	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 (0) 2 20 12 12 34 + 2 20 12 12 36 Fax +420 (0) 2 20 12 12 37 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
Denmark			
Assembly Sales Service	Kopenhagen	SEW-EURODRIVE A/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. +45 (0) 43 95 8500 Fax +45 (0) 43 95 8509 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Estonia			
Sales	Tallin	ALAS-KUUL AS Paldiski mnt.125 EE 0006 Tallin	Tel. +372 (0) 6 59 32 30 Fax +372 (0) 6 59 32 31
Finland			
Assembly Sales Service	Lahti	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 (0) 3 589 300 Fax +358 (0) 3 780 6211 http://www.sew-eurodrive.fi sew@sew-eurodrive.fi
Gabon			
Sales	Libreville	Electro-Services B.P. 1889 Libreville	Tel. +241 (0) 73 40 11 Fax +241 (0) 73 40 12
Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 (0) 19 24 89 38 55 Fax +44 (0) 19 24 89 37 02 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
Greece			
Sales Service	Athen	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 (0) 21 04 22 51 34 Fax +30 (0) 21 04 22 51 59 http://www.boznos.gr Boznos@otenet.gr
Hong Kong			
Assembly Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 (0) 2-7 96 04 77 + 79 60 46 54 Fax +852 (0) 2-7 95-91 29 sew@sewhk.com
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 (0) 1 437 06 58 Fax +36 (0) 1 437 06 50 sew-eurodrive.voros@matarnet.hu



Address List

India			
Assembly Sales Service	Baroda	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi · Baroda - 391 243 Gujarat	Tel. +91 (0) 265-283 10 21 Fax +91 (0) 265-283 10 87 sew.baroda@gecsl.com
Ireland			
Sales Service	Dublin	Alpertown Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 (0) 18 30 62 77 Fax +353 (0) 18 30 64 58
Italy			
Assembly Sales Service	Milano	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 (0) 2 96 98 01 Fax +39 (0) 2 96 79 97 81 sewit@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 (0) 25 79 44 Fax +225 (0) 25 84 36
Japan			
Assembly Sales Service	Toyoda-cho	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Toyoda-cho, Iwata gun Shizuoka prefecture, 438-0818	Tel. +81 (0) 53 83 7 3811-13 Fax +81 (0) 53 83 7 3814 sewjapan@sew-eurodrive.co.jp
Korea			
Assembly Sales Service	Ansan-City	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 (0) 3 14 92-80 51 Fax +82 (0) 3 14 92-80 56 master@sew-korea.co.kr
Lebanon			
Sales	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 (0) 1 49 47 86 +961 (0) 1 49 82 72 +961 (0) 3 27 45 39 Fax +961 (0) 1 49 49 71 gacar@beirut.com
Luxembourg			
Assembly Sales Service	Brüssel	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +352 (0) 10 23 13 11 Fax +352 (0) 10 2313 36 http://www.caron-vector.be info@caron-vector.be
Macedonia			
Sales	Skopje	SGS-Skopje / Macedonia "Teodosij Sinactaski" 66 91000 Skopje / Macedonia	Tel. +389 (0) 9 91 38 43 90 Fax +389 (0) 9 91 38 43 90 sgs@mol.com.mk
Malaysia			
Assembly Sales Service	Johore	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 (0) 73 54 57 07 + 73 54 94 09 Fax +60 (0) 73 5414 04 kchtan@pd.jaring.my
Morocco			
Sales	Casablanca	S. R. M. Société de Réalisations Mécaniques 5, rue Emir Abdelkader 05 Casablanca	Tel. +212 (0) 2 61 86 69 + 61 86 70 + 61 86 71 Fax +212 (0) 2 62 15 88 srm@marocnet.net.ma



Netherlands			
Assembly Sales Service	Rotterdam	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 (0) 10 44 63 700 Fax +31 (0) 10 41 55 552 http://www.vector.nu info@vector.nu
New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 (0) 9-2 74 56 27 Fax +64 (0) 9-2 74 01 65 sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferryroad Christchurch	Tel. +64 (0) 3-3 84 62 51 Fax +64 (0) 3-3 85 64 55 sales@sew-eurodrive.co.nz
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 (0) 69 2410 20 Fax +47 (0) 69 2410 40 sew@sew-eurodrive.no
Peru			
Assembly Sales Service	Lima	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos # 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 (0) 13 49 52 80 Fax +51 (0) 13 49 30 02 sewperu@terra.com.pe
Poland			
Assembly Sales Service	Lodz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 (0) 4 26 77 10 90 Fax +48 (0) 4 26 77 10 99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 (0) 2 31 20 96 70 Fax +351 (0) 2 31 20 36 85 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Romania			
Sales Service	Bucuresti	Sialco Trading SRL str. Madrid nr.4 71222 Bucuresti	Tel. +40 (0) 2 12 30 13 28 Fax +40 (0) 2 12 30 71 70 sialco@sialco.ro
Russia			
Sales	St. Petersburg	ZAO SEW-EURODRIVE P.O. Box 263 RUS-195220 St. Petersburg	Tel. +7 (0) 812 5 35 71 42 + 812 5 35 04 30 Fax +7 (0) 812 5 35 22 87 sew@sew-eurodrive.ru
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 (0) 849 47 70 Fax +221 (0) 849 47 71 senemeca@sentoo.sn
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 (0) 68 62 17 01 ... 17 05 Fax +65 (0) 68 61 28 27 Telex 38 659 sales@sew-eurodrive.com.sg
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO – 3000 Celje	Tel. +386 (0) 3 490 83 20 Fax +386 (0) 3 490 83 21 pakman@siol.net



Address List

South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. + 27 (0) 11 248 70 00 Fax +27 (0) 11 494 23 11 ljansen@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 (0) 21 552 98 20 Fax +27 (0) 21 552 98 30 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 (0) 31 700 34 51 Fax +27 (0) 31 700 38 47 dtait@sew.co.za
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 (0) 9 44 31 84 70 Fax +34 (0) 9 44 31 84 71 sew.spain@sew-eurodrive.es
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 (0) 36 34 42 00 Fax +46 (0) 36 34 42 80 http://www.sew-eurodrive.se info@sew-eurodrive.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 (0) 6 14 17 17 17 Fax +41 (0) 6 14 17 17 00 http://www.imhof-sew.ch info@imhof-sew.ch
Thailand			
Assembly Sales Service	Chon Buri	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 (0) 38 45 42 81 Fax +66 (0) 38 45 42 88 sewthailand@sew-eurodrive.co.th
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service 7, rue Ibn El Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 (0) 1 43 40 64 + 1 43 20 29 Fax +216 (0) 1 43 29 76
Turkey			
Assembly Sales Service	Istanbul	SEW-EURODRIVE Hareket Sistemleri Sirketi Bagdat Cad. Koruma Cikmazi No. 3 TR-81540 Maltepe ISTANBUL	Tel. +90 (0) 216 4 41 91 63 + 216 4 41 91 64 + 216 3 83 80 14 Fax +90 (0) 216 3 05 58 67 sew@sew-eurodrive.com.tr
USA			
Production Assembly Sales Service	Greenville	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 (0) 864 4 39 75 37 Fax Sales +1 (0) 864 439-78 30 Fax Manuf. +1 (0) 864 4 39-99 48 Fax Ass. +1 (0) 864 4 39-05 66 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com



USA			
Assembly Sales Service	San Francisco	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 (0) 510 4 87-35 60 Fax +1 (0) 510 4 87-63 81 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 (0) 856 4 67-22 77 Fax +1 (0) 856 4 67-37 92 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 (0) 9 37 3 35-00 36 Fax +1 (0) 9 37 4 40-37 99 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 (0) 214 3 30-48 24 Fax +1 (0) 214 3 30-47 24 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		
Venezuela			
Assembly Sales Service	Valencia	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 (0) 241 8 32 98 04 Fax +58 (0) 241 8 38 62 75 sewventas@cantv.net sewfinanzas@cantv.net

SEW-EURODRIVE GmbH & Co KG · P.O. Box 3023 · D-76642 Bruchsal/Germany
Phone +49 7251 75-0 · Fax +49 7251 75-1970
<http://www.sew-eurodrive.com> · sew@sew-eurodrive.com

SEW
EURODRIVE





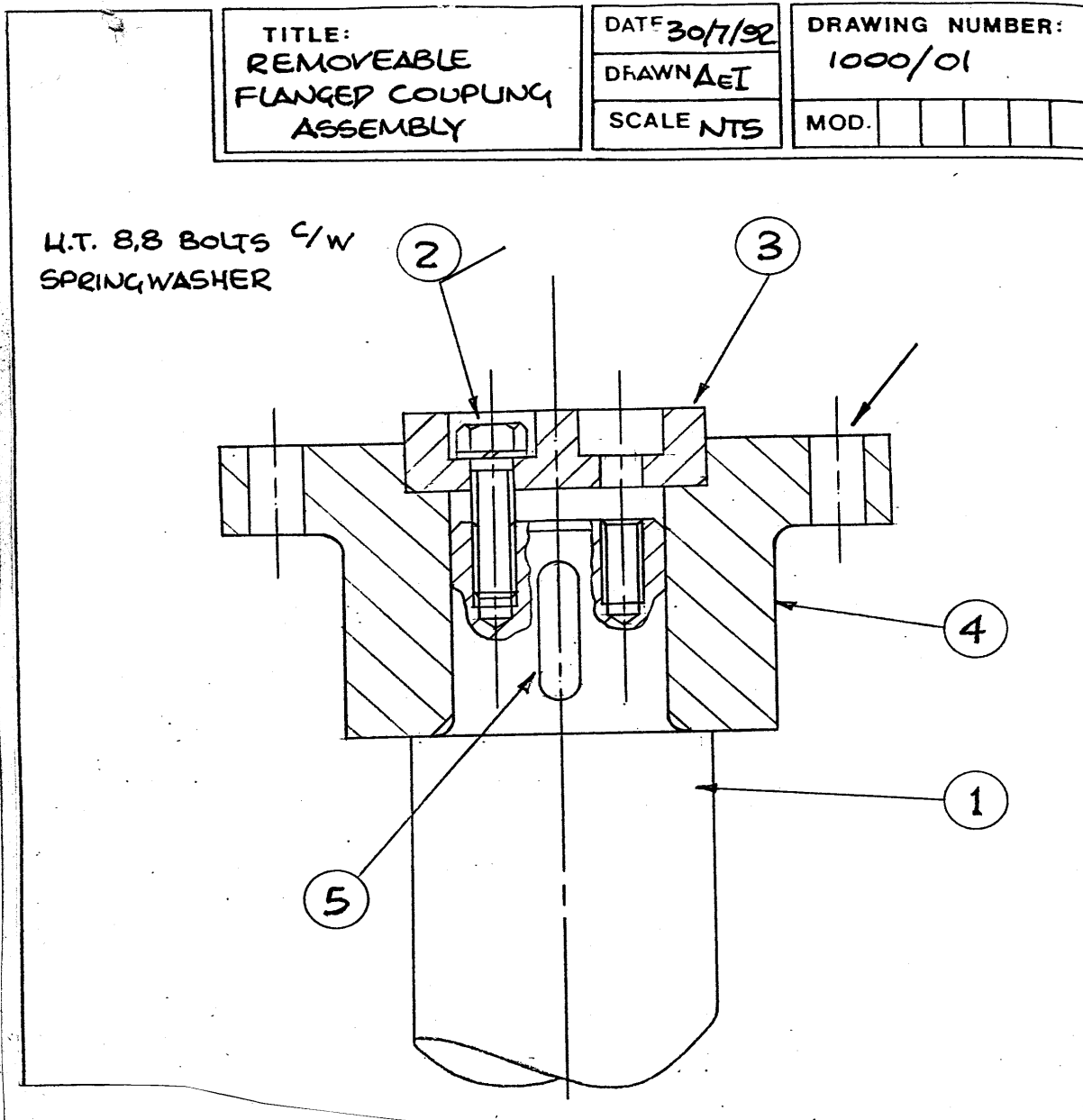
Bredgar Road, Gillingham, Kent, ME8 6PN

Tel: 01634 386683

e.mail: sales @ mixertech.co.uk

Fax: 01634 386684

Internet: www.mixertech.co.uk





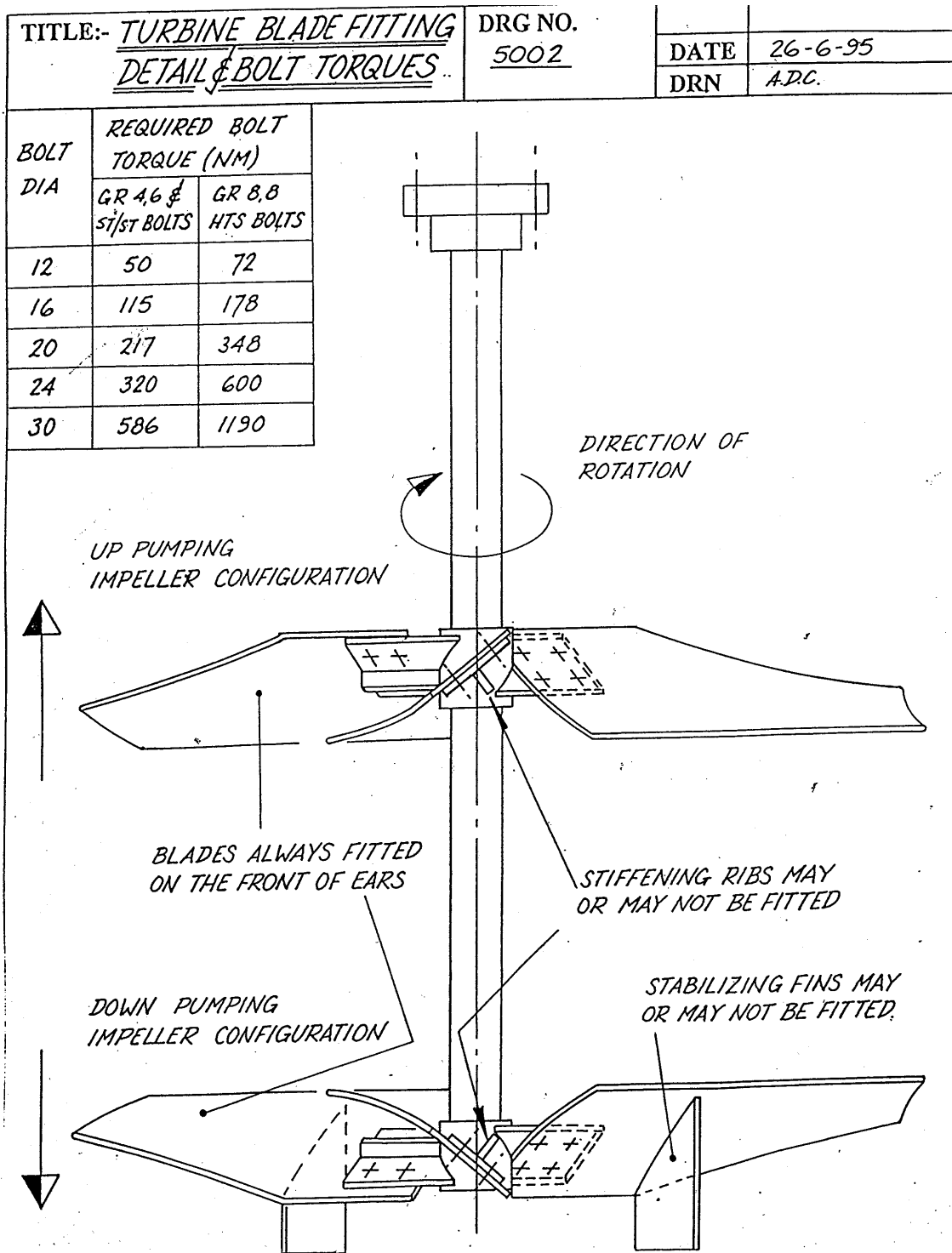
Bredgar Road, Gillingham, Kent, ME8 6PN

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e.mail: sales @ mixertech.co.uk

Fax: 01634 386684

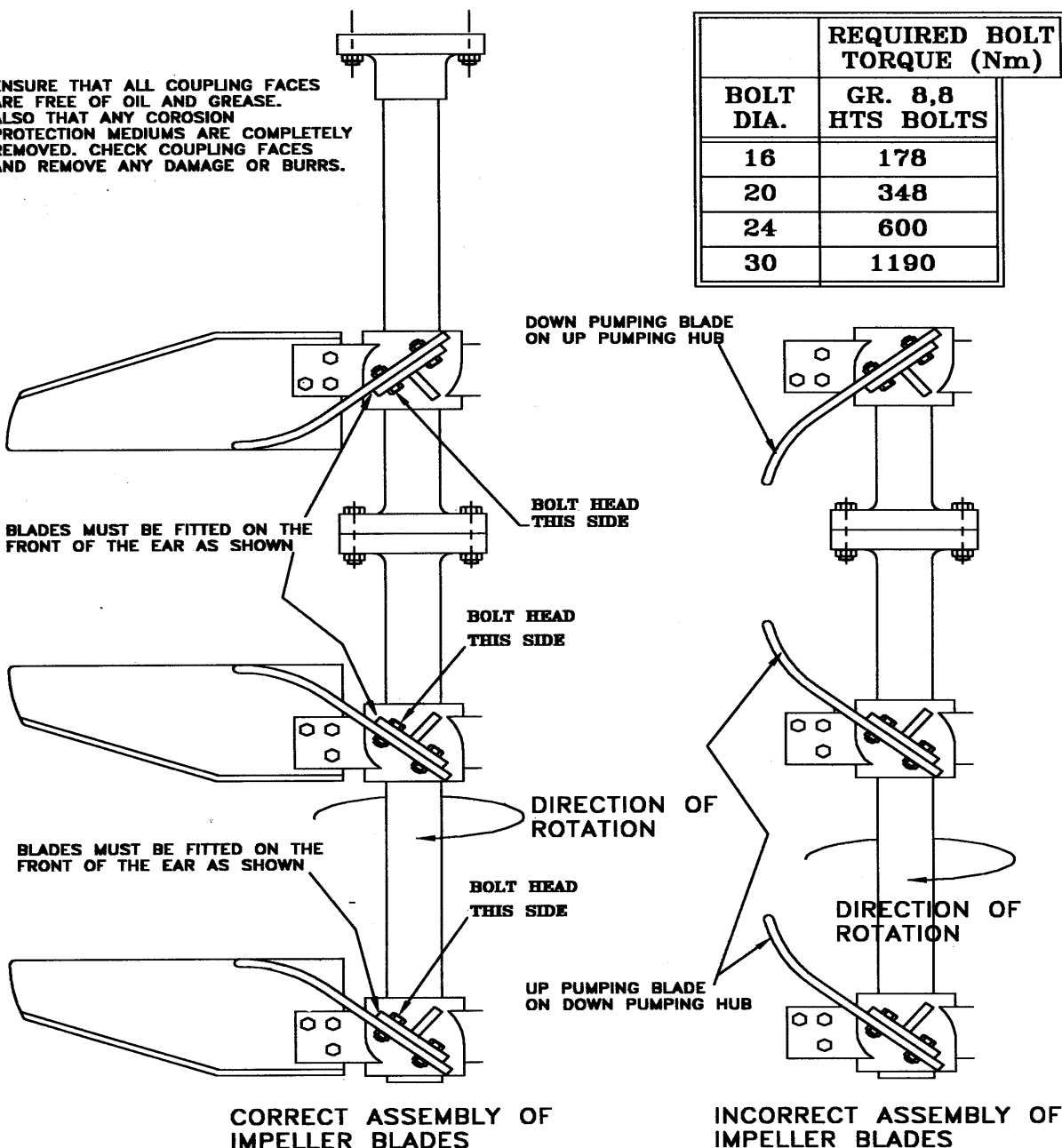
Internet: www.mixertech.co.uk





ENSURE THAT ALL COUPLING FACES ARE FREE OF OIL AND GREASE. ALSO THAT ANY COROSION PROTECTION MEDIUMS ARE COMPLETELY REMOVED. CHECK COUPLING FACES AND REMOVE ANY DAMAGE OR BURRS.

REQUIRED BOLT TORQUE (Nm)	
BOLT DIA.	GR. 8,8 HTS BOLTS
16	178
20	348
24	600
30	1190



MIXERTECH

TEL. 01634 386683

FAX. 01634 386684

GILLINGHAM - KENT

CONFIDENTIAL

DRAWINGS SUBMITTED SHALL REMAIN THE PROPERTY OF MIXERTECH AND ARE STRICTLY CONFIDENTIAL. THE INFORMATION CONTAINED HEREIN SHALL NOT BE DISCLOSED TO THIRD PARTIES WITHOUT PRIOR WRITTEN CONSENT BY MIXERTECH CO.

SCALE:

N.T.S.

DRAWN:

A.E.ISAACS

DATE:

04/05/98

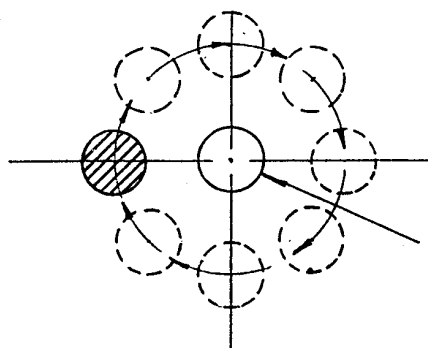
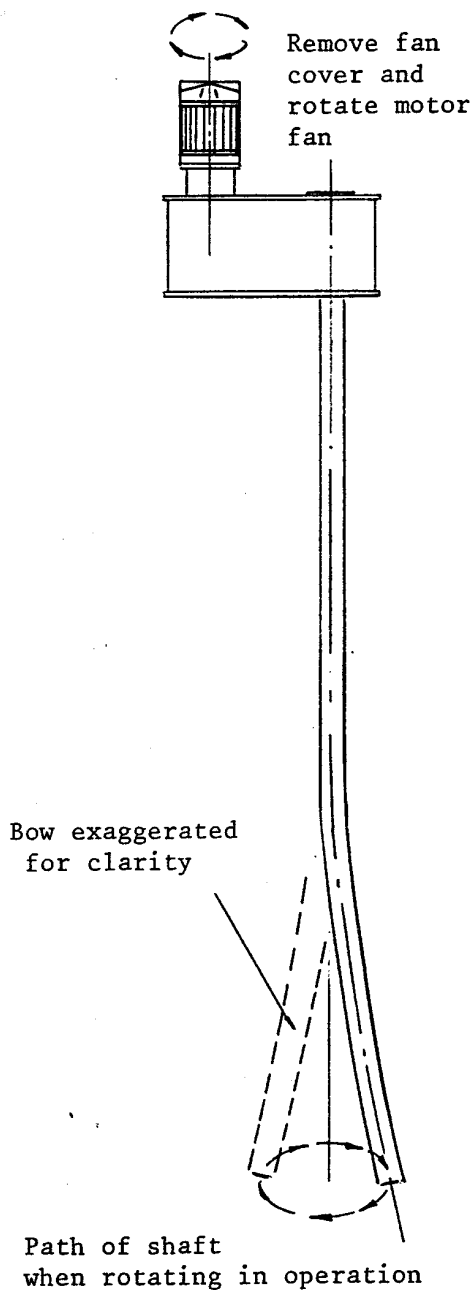
MANUFACTURING NOTES:

1. .
2. .
3. .

TITLE: IMPELLERS AND SHAFT ASSEMBLY

DRG. No.: C14703/ASSY

REV.



INSTALLATION OF BOTTOM STEADY BEARING OR SLAP RINGS

A bottom steady bearing (or slap ring) must be installed only after the drive assembly and lower agitator shaft, complete with impellers, has been assembled and firmly bolted in place. Do not predetermine the exact bearing location from certified tank and mixer outline dimension drawings. The vertical centre line of the steady bearing must coincide with the shaft's axis of rotation to minimise bearing preload.

This axis may not necessarily be at the centre of the tank. The agitator shaft must be hand rotated (using input shaft coupling or motor fan with a fixture attached to the shaft to scribe a line on the tank bottom. The centre of this inscribed area will be the location for the centre of the steady bearing.

The steady bearing should be securely installed, with its vertical centreline coincident with the axis of rotation, as established.

The amount of lateral movement required to bring the shaft into proper alignment with the final steady bearing location will vary, depending upon the shaft length and diameter.

True location of bottom
Steady or slap ring



Bredgar Road, Gillingham, Kent, ME8 6PN
Tel: 01634 386683 e.mail: sales @ mixertech.co.uk
Fax: 01634 386684 Internet: www.mixertech.co.uk

SUPPLY OF MACHINERY (SAFETY)

REGULATIONS 1992

The mixer or agitator is considered part of a system and therefore is **not** CE marked.

A Declaration of Incorporation is supplied in accordance with this.

IMPORTANT

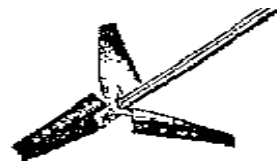
By design, the shaft and impeller of a mixer cannot be guarded.

The unit therefore must not be operated unless it has been installed in the relevant vessel (system) which must comply with the machinery directives.

In addition, we recommend that the electrical supply be equipped with isolators to ensure that the mixer cannot be run whilst entry made to the vessel i.e. manways covers and inspection hatches etc.

Note:

This machinery must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the machinery directive.



DECLARATION OF INCORPORATION

Name & Place of Business: Mixertech Limited
Bredgar Road
Gillingham
Kent, ME8 6PN

Responsible Person: Mr A. LaMoury - General Manager

Machinery Description: Series 1000, 2000 and 3000 Top Entry
Mixers and Agitators.

Series 5000 Side Entry Mixers and
Agitators.

EC Type Examination Certificate: Not Applicable

Body To Which Technical File Has Been Forwarded: Not Applicable

Approved Body Issuing Certificate Of Adequacy: Not Applicable


**Transposed Harmonised Standards, National Standards & Technical Specifications
Used.**

Description	B.S. No	EN/ISO/CEN
Code of Practice for earthing	7430 (1991)	
Guide to common aspects of installation and equipment for protection against electric shock	PD 6535 (1993)	IEC 1140
Requirements for electrical installations, IEE wiring Regulations, 16th Edition	7671 (1992)	IEC 364
Memorandum: Construction of electrical equipment for protection against electric shock	2754 (1976)	IEC 536

Electrical equipment of industrial machines	2771 Part 1 (1986)	EN 60204 IEC 204. 1 & 2
Code of practice for control of undesirable static electricity	5958 Part 1 & 2 (1991)	
Safety of machinery. Emergency Stop equipment, functional aspects. Principals for design	BS EN 418 (1992)	EN 418
Safety of machinery, Basic concepts, general principles for design	BS EN 292 Parts 1 & 2 (1991)	EN 292
Safety of Machinery. Terminology	DD ENV 1070 (1993)	ENV 1070
Code of Practice for safety of machinery	5304 (1988)	

THE MIXER(S) ARE CONSIDERED AS COMPONENTS OF A SYSTEM.

THIS MACHINERY MUST NOT BE PUT INTO SERVICE UNTIL THE MACHINERY INTO WHICH IT IS TO BE INCORPORATED HAS BEEN DECLARED IN CONFORMITY WITH THE PROVISIONS OF THE MACHINERY DIRECTIVES 89/392/EEC, 91/368/EEC, 93/68/EEC AND 93/44/EEC.

Signed 

A. LA MOURY
Name (Block Capitals)

GENERAL MANAGER
Position

For and on behalf of Mixertech Limited